



POWER SYSTEM RELAYING COMMITTEE

OF THE

IEEE POWER ENGINEERING SOCIETY

MINUTES OF THE MEETING

May 12 – 14, 2010

Madison, WI

First Draft

**Power System Relaying Committee
Main Committee Meeting Agenda**

May 13, 2010

Madison, WI

1:30 PM – 4:00 PM

- | | |
|---|-------------------------|
| I. Call to order / Introductions | Miriam Sanders |
| II. Approval of Minutes/Financial Report | Roger Hedding |
| III. Reports of Interest | Miriam Sanders |
| A. Technical Paper Coordinator's Report/Future Meetings | Bob Pettigrew |
| B. PES Report- points of interest | |
| C. CIGRE Report | M. Adamiak |
| D. UCA Report | John Burger |
| E. IEC Report | Eric Udren |
| F. Standard Coordinator's Report | Jeff Gilbert |
| G. NERC Report | Eric Allen |
| H. Other Reports of Interest | |
| IV. Advisory Committee Reports | Miriam Sanders |
| B1. Awards/ Recognition | Oscar Bolado |
| V. Subcommittee Reports | Miriam Sanders |
| C- System Protection | Rich Hunt |
| I - Relaying Practices | Bob Beresh |
| K - Substation Protection | Pratap Mysore |
| H - Relaying Communications | Veselin Skendzik |
| D - Line Protection | Mike McDonald |
| J - Rotating Machinery | Kevin Stephan |
| VI. Presentations | Roger Hedding |
| Relaying and Redundancy – I19 | Solveig Ward |
| Understanding Microprocessor-Based Technology Applied to Relaying – I1 | Moh Sachdev |
| VII. Adjourn | Miriam Sanders |

I. Call to order / Introductions

Sanders

Chairman Miriam Sanders called the meeting to order at 1:30 PM

II. Approval of Minutes (January Meeting) & Financial Report

Hedding

The minutes of the Orlando (May 2010) meeting were approved. With the increase in registration fees we managed not to lose any money for the Madison meeting.

III Chairman’s Report

Sanders

Meeting was called to order at 1:30 PM, Thursday May 13, 2010. After introductions, we welcomed the local attendees, including Dr. Willis Long. Then all main committee members were asked to stand and were counted. A quorum was met.

It is with great sadness that we announce the passing of two fellow PSRC members. Walt Elmore passed away in January shortly after the Orlando meeting. He was a dynamic engineer and a solid influence in the PSRC and PES for many years. Additionally, our long time historian, Mr. James D Huddleston, III passed away the 2nd week of May. Jim was always snapping pictures of our events as well as a valuable participant on many working groups. We will miss both.

We held our first of several administrative meetings to assist with the standards that have been designated as Smart Grid Initiatives. This meeting is not for writing the standards, but to provide support for the working group chairman in producing the documents in a timely manner. Sue Vogel and Matt Cigelia were available for assistance and to describe some tools available. Remember that holding conference calls in-between meetings is encouraged! There will be another one of these meetings at the September meeting, so if you are a chair for one of the SG standards, please plan on attending!

This was the third meeting of our new elongated formatted, ending on Thursday afternoon. ***Our next meeting in September will be the first that will start on Monday afternoon.*** We have added a half-day of working group meeting time slots to eliminate conflicts of the 65 plus active working groups.

We are in the final stages of revising the Operations and Procedures Manual for the PSRC. Once complete, this will be available for your reference on the PSRC web page. The new updates will include clarification of quorum requirements, as well as some other changes that are required to the meet the PES Technical committee’s requirements.

Reminder to Main Committee members that it is your duty to attend the Main Committee meeting, to review papers for the PES conferences, to be a member of the balloting pool for the PSRC standards, and to promote leadership within the committee.

We are looking forward to the September meeting in Berkeley, CA. Be sure to mark your calendars for the week of September 13, 2010.

Reports of Interest

A. Technical Paper Coordinator’s Report

Pettigrew

May 2010

Madison, WI

The IEEE T&D Conference was recently concluded. PSRC has one poster session at that event. The PES General Meeting is in July.

A. 2010 T&D Conference-

New Orleans, LA

April 2010

At T&D 19 papers were scheduled for presentation at the Poster Session. A big thanks to Russ Patterson for being the PSRC session chairman. The authors for 12 of the 19 papers attended the poster session to discuss their papers. The other 7 papers were not presented and will not be archived in IEEE Xplore.

The T&D Conference does not provide paper sessions for presentation of worthy papers.

B. PES General Meeting July 25-29, 2010 Minneapolis, MN

A total of 35 papers were approved for the 2010 PES General Meeting. A total of five sessions have been scheduled for the 2010 GM.

- 3 PSRC Paper Sessions - 21 papers
- 2 PSRC Paper Forum Sessions - 14 papers

Future Meetings

September 13-16, 2010 Berkeley California

January 10-14, 2011 Atlanta, GA (JTCM)

May 16-19, 2011 Asheville, NC

September 12-15, 2011 Minneapolis, Minnesota

Jan 2012 - TBD (JTCM)

May 2012 - TBD

September 10-13, 2012 at Hilton Portland; Portland, OR

B PES Report

Wanda Reeder

No Report submitted.

C. CIGRE B5 Activities Report

Adamiak

No report submitted.

D. Substation Committee

Preuss

The Substations Committee will be meeting next week, and will address the suggestions from PSRC regarding possible additions or revisions to C37.2 Device Function Numbers. At this time, the proposal to make this a dual logo standard is stalled at IEC. An informative History Annex to IEEE 1613 is ready for ballot – an extension of the History Annex, and a similar annex is in the latest draft of IEEE C37.90.1 Oscillatory and Fast Transient Tests. Balloting is complete for the approval of DNP3 as an IEEE standard. From start to finish, and with great support from IEEE SA staff, this was accomplished in less than six months – including three recirculation ballots.

E. EPRI Report

Hughes

No Report. Submitted

F. IAS Power System Protection Committee

Mozina

The following are items of interest to the PSRC:

- **Color Book Reorganization Progress** – The IAS Industrial & Commercial Power System Dept. — I&CPS (responsible of the IAS color books) held its meeting on May 10-13 in Tallahassee, FL. This group is updating and converting the color book series into individual IEEE standards. The major item of interest for

the PSRC is the Buff Book (Protection and Coordination of Industrial and Commercial Power Systems). The draft of the standard on instrument transformer has been completed and has been submitted for balloting. Progress continues to be slow due to the lack of manpower.

- **Generator Grounding and Ground Fault Protection WG** –The WG is continuing its efforts to investigate grounding at MV industrial facilities with multiple ground sources. The goal is to produce a WG IAS transaction paper providing guidelines/recommendation for determining the optimum level of ground current in MV industrial system with multiple ground sources. The WG met at the I&CPS meeting on May 9 in Tallahassee, FL where writing assignments were discussed.
- **Arc Flash** – The IAS is the home of IEEE standard 1584-2004, a key Arc Flash standard that is currently under revision. The WG that is updating this standard will meet at the Petroleum and Chemical Industry Committee Conference (PCIC) to be held in San Antonio, TX in Sept. Significant changes are expected to be made to this standard.

G. IEC Report

Udren

TC 95, Measuring relays

There are no new activities for electrical environment testing. Recent TC 95 documents:

- 95/260/DC - Proposed revision of IEC 60255-27, Measuring relays and Protection equipment – Part 27: Product safety requirements. Over 30 technical issues came up during FDIS voting, so a revision project will begin sooner than it will normally occur.
- 95/261/RVC – 60255-127: Functional requirements for over/under voltage protection – has been accepted and will be issued as an international standard.
- 60255-121 - Functional requirements for distance relays – WG, PSRC, and USNC submitted 30 pages of compiled comments. Murty Yalla is arranging a special meeting at the Berkeley PSRC meeting in September for IEC MT4 representatives and US commenters to resolve issues.

Development of functional standards is today's significant area of TC 95 standardization. Murty Yalla leads Maintenance Team MT4 of TC 95 that works on these and provided background information.

- 60255-151 - Functional requirements for overcurrent relays.
 - a. FDIS approved
- 60255-127 - Functional standard for over/under voltage protection – CDV had no negative votes, so IEC skipped the FDIS step and standard is approved.
- 60255-149 – Functional standard for thermal relays – to update 60255-8 – a WG has begun a skeleton draft.
- 60255-187-1,2, 3 family of standards - Functional standard for biased or percentage differential protection – to update 60255-13
 - b. -1 – Generator and transformer diff relays – end of 2010.
 - c. -2 – Line differential relays - later.
 - d. -3 – Bus differential relays – later.
 - e. We might expect tests under a full range of operating conditions as is now being developed for 60255-121.

IEEE is helping PSRC work with IEC in support of Smart Grid standards needs:

- C37.111/60255-24 COMTRADE – the completed draft revision from PSRC WG H4 has been completed by WG and will be circulated to IEC member countries on a fast track for approval of the IEC version.
- C37.118 Synchrophasor Standard – to achieve compatibility with IEC standards organization, PSRC is splitting into C37.118.1 measurement part, that can be dual logo or dual standard when completed. There will be a separate C37.118.2 communications part that will make minor fixes to existing C37.118 communications; IEC TC 57 WG 10 has already started working on in IEC 61850-

90-5 transport services for synchrophasor values that would become the ultimate international solution based on Ethernet.

- C37.239 COMFEDE common format for event data exchange – has been a Trial Use Standard in its PAR, but was just elevated at SC H to full standard so it can be tracked for IEEE/IEC dual logo.

TC 95 will meet at the IEC General Meeting in Seattle in October 2010 due to our successful program to raise \$18,000 to cover hosting costs.

TC 57, Power systems management and associated information exchange

See TC 57 liaison report at the end of SC H minutes.

IEC TC57 / WG10 is currently working on the following topics:

(1) Preparation of Edition 2 of IEC 61850:

A first group of parts are already published or close to publication as Edition 2. These include the following:

- a. Part 6 (configuration language) and 7-4 (Logical Nodes) has been published as IS. They already include the updates for substation to substation communication.
- b. Part 7-2 and 7-3 are ready to be circulated as FDIS. Parts 7-1, 8-1 and 9-2 will be submitted as FDIS within the next two month. These parts are expected to be published this fall.
- c. Part 4 (System and project management) has been approved as CDV. FDIS will be prepared following the WG meeting in June.
- d. Work on the remaining parts (1, 3, 5 and 10) has started,

(2) There are different task force working on preparing technical reports:

- a. IEC 61850-90-3 – using IEC 61850 for condition monitoring
- b. IEC 61850-90-4 – network engineering guidelines
- c. IEC 61850-90-5 – using IEC 61850 to transmit synchrophaser data according to IEEE C37.118. This is a joint work with IEEE PSRC HTF3.

(3) We planned to start working on functional testing. A document will be circulated to ask for additional experts for that topic.

(4) A report on the requirements for a future webbased publication of the models defined in IEC 61850 will be circulated.

(5) As new activities, it was suggested to start working on modelling of logics in IEC 61850.

IEC TC57 / WG17 is working on extending the models for distributed energy resources in particular adding photovoltaic's. A task force was created that shall prepare a technical report about the use of IEC 61850 for Distribution Automation.

IEC TC57 / WG18 is preparing IEC 61850-7-510: use of the logical nodes defined in IEC 61850-7-410 to model applications for the control of hydro power plants. WG 18 is as well starting to prepare the second Edition of IEC 61850-7-410. That work is focused on refining the different details of the logical nodes based on experience with first implementation considerations.

H. Standard Coordinators Report

Gilbert

Standard Coordinators Report May 13, 2010

The Standards Coordinator, Jeffrey Gilbert, met with the Chairs of the Working Groups writing and revising standards documents at a session beginning at 8:00 AM on May 11, 2010, in the Capitol Ballroom B of the Madison Concourse Hotel and Governor's Club. Matt Ceglia gave a presentation on the balloting process. Matt was followed by Moira Patterson who gave a presentation on the REVCOM process.

Important Information

Phillip Winston has agreed to be the Standards Coordinator beginning in January 2011.

The obligations signoff page to be incorporated into myProject has been delayed.

Standards Activities Since The January, 2010 Meeting

The status of standards activities that have taken place since the January, 2010 meeting of the PSRC are as follows.

1. Standards Published

None

2 Standards waiting to be Published

None

3. Standards Reaffirmed

C37.90.2 Standard For Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers

4. Standards submitted for reaffirmation

C37.90.2 Standard For Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers

5. Standards approved

None

6. Standards submitted for approval

None

7. Standards to be submitted for approval

None

8. Submitted for Balloting/ Recirculation

C37.103 Guide for Differential and Polarizing Relay Circuit Testing

9. Standards Balloted

C37.93 Guide for Power System Protective Relay Applications of Audio Tones over Telephone Channels

PC37.239 Standard Common Format for Event Data Exchange (COMFEDE) for Power Systems

10. Standards Re-circulated

C37.90.2 Standard For Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers

C37.93 Guide for Power System Protective Relay Applications of Audio Tones over Telephone Channels

PC37.239 Standard Common Format for Event Data Exchange (COMFEDE) for Power Systems

11. Standards to be Re-circulated

C37.103 Guide for Differential and Polarizing Relay Circuit Testing

PC37.105 IEEE Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations

12. Standards due for 5 year review /to be submitted for Re-affirmation

C37.90 Standard for Relays and Relay Systems Associated with Electrical Power Apparatus

C37.92 Standard for Low Energy Analog Signal Inputs to Protective Relays

C37.118 Standard for Synchrophasors for Power Systems (active PAR - not necessary)

C37.119 Guide For Breaker Failure Protection of Power Circuit Breakers

C57.13.3 Guide for Grounding of Instrument Transformer Secondary Circuits and Cases (active PAR - not necessary)

13. Standards withdrawn

None

14. New PARs applied for

PC37.241 Guide for Application of Optical Instrument Transformers for Protective Relaying

PC37.242 Guide for Synchronization, Calibration, Testing and Installation of Phasor Measurement Units for Power System Protection and Control

PC37.118.2 Standard for Synchrophasor Data Transfer for Power Systems

15. New PARs approved

C37.115 Standard Test Method for Use in the Evaluation of Message Communications Between Intelligent Electronic Devices in an Integrated Substation Protection, Control and Data Acquisition System

PC37.241 Guide for Application of Optical Instrument Transformers for Protective Relaying

16. PAR Extensions applied for

PC37.236 Guide for Power System Protective Relay Applications over Digital Communication Channels

17. PAR Extensions approved

None

18. Modified PAR approved

None

19. Modified PAR Submitted

PC37.118.1 Standard for Synchrophasor Measurements for Power Systems (PC37.118 modified)

20. PARs Withdrawn

None

21. PARs expiring at the end of 2009

PC37.105 IEEE Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations

PC37.113 Guide for Protective Relay Applications of Transmission Lines

PC37.236 Guide for Power System Protective Relay Applications over Digital Communication Channels

SUBMITTAL DEADLINES & STANDARDS BOARD MEETING SCHEDULE

PAR/Standard Submittal Deadline Standards Board Meeting

February 12, 2010

March 23, 2010

May 7, 2010

June 15, 2010

August 20, 2010

September 28, 2010

October 18, 2010

December 6, 2010

No Report

IV. B. ADVISORY COMMITTEE REPORTS

Sanders

Chair: Miriam Sanders
Vice Chair: Bob Pettigrew

B1: Awards and Technical Paper Recognition

Chair: Oscar Bolado
Vice Chair: Solveig Ward

The B1 Working Group met on May 12th, 2010 in Madison, WI, with 6 of its 7 members.

The minutes of the last meeting were reviewed and approved.

The group was informed on changes to the PES Awards leadership.

Oscar is in conversations with the PSRC webmaster to start the B1 pages. The initial information to upload is updated award recipients.

A list of certificates has been ordered from PES. The new chair planned to have them ready for PES general meeting. We will get them for our September meeting. The group discussed that subcommittees should encourage the use of the word "disbanded" in their minutes so is easy to spot when WGs complete their assignment.

Mal provided the Service Awards guidelines and the list of awarded certificates for the record.

The group has generated criteria for the Distinguished & Career Services and selected candidates for the 2010 awards. Plaques will be ordered to hand out in September. Later on the idea is to give the awards in January. Criteria will be included in the WG manual.

Papers for price papers have been collected and will be distributed and discussed online. Nominations will be done in September.

With no additional business to discuss the meeting was adjourned.

B2: Fellows Awards

Chair: C. Henville

No Report

B3: Membership Committee

Chair: M.J. Swanson

Attendance during the PSRC meeting was approximately 220. This is excellent attendance for a May meeting with no joint meeting partners.

19 new attendees were in our Newcomers Orientation meeting on Tuesday.

No retention support letter were written, nor Service Awards

B4: O & P Manual and WG Training

Chair: J Appleyard O&P Manual
Chair: R Hunt WG Training

No report.

B5: Bibliography and Publicity

Chair: T.S. Sidhu

Vice Chair: M. Nagpal

No report Submitted

B8: Long Range Planning

Chair: C. Henville

No report submitted

B9: PSRC Web Site

Chair: R. Patterson

Working Group B9 did not meet.

V. SUBCOMMITTEE REPORTS

C: SYSTEM PROTECTION SUBCOMMITTEE

Chair: R. Hunt

Vice-Chair: S. Ward

The C System Protection Subcommittee met on Thursday, May 13, 2010, in Madison with 16 members and 25 guests in attendance. Quorum was not reached and approval of the three items below was made via email.

9 Working Groups and 1 Task Force met at this meeting.

The members of the Subcommittee approved the minutes of the September 2009 meeting via email.

WG J3 is working on coordination issues between the Power System and Generating Plants and the question came up if this was something that would require a Working Group in Subcommittee C. Rich Hunt attended the J3 WG meeting and found that there is no need for Subcommittee C to get involved.

Two working groups, C4 and C9, have completed their assignments and requested to be disbanded. The requests were approved by the C members via email.

New members: Gene Henneberg, George Bartok and Jim Hackett were welcomed as members of the C Subcommittee.

PSCE liaison report: Nothing to report.

PSSC liaison report: Charlie Henville reported that possible joint activities between PSRC and PSSC at the January meeting will be discussed when PSSC meets at the IEEE PES general meeting in July.

Reports from the WG Chairs

C2: The Role of Protective Relaying in Smart Grid

Chair: A. Apostolov
Vice-Chair:
Output: Report
Established: January 2010
Expected Completion Date: -

The WG met on Wednesday, May 12. An outline was developed and writing assignments handed out.

Coordination with WG H2 (Protective Relay Application Using Smart Grid Communication Infrastructure) was discussed. While it is anticipated that the C2 document will become a section in a joint H2/C2 report, the H2 report may be published on its own first as it is much nearer completion than C2. However, H2 believes that the report will be a living document with frequent updates as the Smart Grid initiatives start to be implemented. The C2 section would then be included as such an update.

While H2 and C2 work on a similar subject, they complement each other rather than overlap. H2 focuses on protective relaying use of information made available by the Smart Grid while C2 focuses on information or services from protective relaying in support of the Smart Grid.

C4: Global Industry Experience with System Integrity Protection Schemes (SIPS)

Chair: Vahid Madani
Vice Chair: Miroslav Begovic
Output: Survey
Established: September 2004
Expected Completion Date for the Survey: Completed

Assignment - Conduct a survey of power systems professionals worldwide to accumulate experience with SIPS. This survey will complement and expand upon the previously published IEEE/CIGRE paper "Industry Experience with Special Protection Schemes" by P.M. Anderson and B.K. LeReverend (IEEE Transaction on Power Systems, Vol. II, No. 3, August 1996). The survey will be conducted via an internet-based questionnaire with the assistance of, and be available to, other interested parties; (e.g. IEEE, CIGRE, PES, EPRI, etc.). The survey should be concluded by September 2008 and will be presented in a report to the "C" Subcommittee and a Summary Transactions paper.

The WG C-4 met on May 11 in one session with total of 13 attendees.

The WG members and guest attendees reviewed the status of the Survey. The final report was approved by the C subcommittee in May 2009.

The WG members also completed the transaction paper at the September 2009 meeting, and submitted the IEEE transaction. Transaction paper has been accepted and we have received formal confirmation.

The WG members are working on presenting the paper at conference next. Has been proposed for some of the conference papers – Abstract preparation for conference papers is in progress.

The WG members believe their task is completed and request that the C-4 be dissolved.

C5: Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMU) applied in Power System Protection and Control

Chair: Jim Hackett
Vice Chair: Paul Myrda
Output: Guide PC37.242
Established: January 2010
Expected Completion Date: June 2011

Assignment

Develop a guide that provides guidance for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMU) applied in Power System Protection and Control.

The Working Group met on May 12, 2010 with 6 members and 12 guests.

The Scope, Purpose and Needs statements were reviewed and approved unanimously by the quorum of members present.

The PAR has been submitted for PC37.242, has been accepted by the Sponsor and will be considered at the 29 Sep 2010 NesCom meeting.

The next step is to develop an integrated document for review by the working group prior to the September meeting.

C9: Appl. of Prot. Relays used for Abnormal Freq. Load Shed. & Restoration

Chair: A. Apostolov

Vice-Chair: K. Behrendt

Output:

Established:

Expected Completion Date: Completed.

Assignment: The project will develop a Guide for the application of protective relays used for load shedding and restoration during electric power system abnormal conditions. It will present background information, bibliography, and recommendations. It discusses abnormal frequency power system behavior, existing load shedding and restoration practices, the abnormal frequency of typical protective relays, and possible new methods for improving load shedding and restoration. This project is limited to electric power system applications and will not include Abnormal Frequency Protection for Power generating Plants

C9 did not meet in May. A summary paper has been completed and will be published as a final IEEE transaction paper.

C11: Guide for Protection System Testing (PC 37.233)

Chair: Vahid Madani

Vice Chair: Hyder DoCarmo

Output: Guide C37.233

Established: May 2005

Expected Completion Date – Balloting Body: August 2008

PAR Approved through: December 2009

Assignment: This guide is intended for power system protection professionals. It will include a reference listing of type tests for protective devices as well as overall protection scheme performance tests for various types of protection schemes. The Guide will describe the methods, extent, and types of protection scheme tests. Interlocking and control functions inherent to the protective schemes are included. This assignment encompasses overall system testing procedures, data collection requirements, as well as the test procedure definitions.

This Guide has completed the balloting and RevCom process and is an approved Guide under IEEE Publishing. Thanks to the efforts of the working group (WG) members.

The WG also plans to coordinate a presentation for the Main PSRC Committee in September 2010.

The WG would remain active for the purpose of conference papers – The WG is recruiting contributing members and presenters for various conference venues.

C13: Undervoltage Load Shedding

Chair: M. Begovic

Vice-Chair: S. Imai

Output: IEEE Report

Established: September 2005

Expected Completion Date: September 2010

Assignment: This working group produces a report on the implementation of undervoltage load shedding (UVLS) in electric power systems. It presents background information, guidance in implementing UVLS schemes and a bibliography. Voltage instability, voltage and reactive power management, emergency actions to avoid load shedding, UVLS philosophy and methods, voltage collapse detection, existing practices, settings and coordination between UVLS and UFLS are discussed

The WG meet on May 12 2010, in one session, attended by 5 members and 6 guests.

WG Vice Chair Shinichi distributed the latest Draft 5.0 of the report to meeting attendants for review and discussion. Changes made since the last meeting was described.

The process to approve the report was discussed at the meeting since the report is already in a completed form. It has been concluded that WG Chair and Vice Chair should distribute this final version to WG group members for final approval. Once it is approved by the WG members, WG Chair and Vice Chair will send the approved report to C subcommittee for subcommittee approval and incorporate any requested changes from C subcommittee members.

The need to publish a transaction paper for the report was briefly discussed. It has been decided this should be discussed at the September WG meeting.

Action items:

WG Chair/Vice Chair to send finalized version to WG members by May 17, 2010 for their final approval

WG members to respond to WG Chair/Vice Chair by May 31, 2010 to indicate if they approve the finalized version of the report

If approved by WG members, WG Chair/Vice Chair will send the approved report to C-subcommittee Chair/Vice Chair by June 15, 2010 for their review and approval

WG Chair/Vice Chair will work with C-subcommittee to incorporate any requested changes as necessary

C14: Use of Time Synchronized Measurements in Protective Relaying Applications

Chair: Jim O'Brien

Vice Chair: Alla Deronja

Output: IEEE Report

Established: May 2007

Expected Completion Date: May 2011

Assignment: Produce a general report to PSRC Subcommittee C outlining practical protection applications using synchrophasors.

Working group C14 met on May 11, 2010, in Madison, WI, in a single session chaired by Jim O'Brien with 9 members and 38 guests present. 3 guests joined the working group as members.

The chair distributed the latest draft of the proposed Outline and Report, which were discussed, including the latest received contributions and comments.

In Section II Background, Juergen Holbach contributed subsection d, CT considerations. Mark Adamiak commented that synchrophasors are being split in two classes: P-class, which includes synchrophasors with a very fast response of 16 ms, and M-class, which includes the rest of synchrophasors with a slower response.

Mark will work with Juergen to update subsection d according to the discussion at the meeting and add the P- and M-class synchrophasor definitions to subsection a, Definition of synchrophasor measurements.

In Section III Communications Infrastructure, Ken Martin will extend subsection a, Requirements, to explain the nature of the 0.1% data unavailability and 1-2 seconds delay for operator awareness.

The chair will need to get in contact with the author (Yuan Liao) of subsection a, Power swing detection, of Section III Present Applications to clarify the methods of power swing detection based on reference paper "Synchronized phasor measurement in protective relays for protection, control, and analysis of electric power systems" by G. Benmouyal, E. O. Schweitzer, III, and A. Guzman.

Herb Faulk will contribute a new subsection to Section II Background on the subject of the impact of reporting rates and latency on synchrophasor measurements.

Gary Kobet/Ritchie Carroll will contribute an addition to subsection f, Wide area disturbance recording, of Section IV Present Applications on the NASPI work.

Several previous writing assignments are still outstanding and need to be submitted as soon as possible. The contributors with missing assignments will be contacted.

Please submit the writing assignments to the WG Chair (Jim.O'Brien@duke-energy.com) by July 1st, 2010. The Chair will distribute the report draft to the members of the working group on or about August 1st. The comments of the WG members will be discussed at the September 2010 meeting.

The WG targets May of 2011 for finishing the report.

C15: Design and Testing of selected SIPS

Chair: J. Sykes

Vice-Chair: Y. Hu

Output: Report on industry practices in design and testing of selected SIPS

Established: September 2008

Expected Completion Date: December 2012

Assignment: Write a report in industry practices and testing of selected SIPS (System Integrity Protection Schemes)

Working group C-15 met on Wednesday, May 12, 2010 in single session with a total of 22 people in attendance (11 members and 11 guests). January meeting minutes was approved without any further comments.

Dr. Kokai of Hitachi made a presentation "Introduction to on-line TSC and ISC systems", describing an on-line Transient Stability Control (TSC) system installed at Chubu Electric Power Co. (CEPCO), and a new on-line, real-time Integrated Stability Control (ISC) system currently under development. This was followed by an engaging Q&A discussion related to various aspects of the TSC and ISC. It was indicated that the WG is interested to learn more about design considerations and test practices of such systems for incorporating into this report. Dr. Kokai will review the sections of the paper that relate to the scheme discussed above and provide his comments.

The working group then proceeded to discuss the gaps in the current version of the updated draft report and the actions need to bridge those gaps. Vahid Madani and Gene Henneberg agreed to assist Alex Apostolov with contributions to "Adaptive Load Mitigation" scheme section. The possible addition of "System Separation" section based on materials provided by Alla Deronja was discussed. It was decided WG Chair should check with C subcommittee whether this involves the change of scope for the WG assignment.

Next step actions:

Next step actions before September 2010 PSRC meeting as follows:

- WG Chair/Vice Chair to clarify with C subcommittee concerning scope of paper and schemes and addition of a System Separation scheme?
- WG Chair/Vice Chair to continue collect contributions from WG members
- WG Chair/Vice Chair to edit and distribute updated draft report before September meeting

The working group will meet at September 2010 PSRC meeting in one session to review the next draft of the report.

C16: Relay Scheme Design Using Microprocessor Relays

Chair: T. Seegers

Vice-Chair: R. Lascu

Output: Report

Established: September 2008

Expected Completion Date: To be determined

Assignment: Write a supplement to the existing 1999 relay trip circuit design paper as an IEEE report to address microprocessor relays.

Working Group C16 held its meeting on Wednesday morning with 35 attendees. Eight working group members were in attendance. The meeting was chaired by current vice chair Tony Seegers.

Draft 2.0 of the paper was discussed.

K. Behrendt will submit writing on use of multiple contacts. Rich Hunt will submit writing on design for accelerated tripping and choice of contacts. Section 5.1 will be reviewed and rewritten by D. Lukach and T. Seegers.

All writing assignments are due by June 30.

C17: Fault Current Contribution from Wind Plants

Chair: D. Miller

Vice-Chair: G. Henneberg

Output: Report by the Joint Working Group

Established: January 2009

Expected Completion Date: 2011

C17 is part of a Joint Work Group among Transmission and Distribution Committee (T&DC), Electric Machinery Committee (EMC) and Power System Relaying Committee (PSRC) C17.

Joint WG Assignment: To characterize and quantify short circuit current contributions to faults from wind plants for the purposes of protective relaying and equipment rating, and to develop modeling and calculation guidelines for the same.

C17 WG Assignment: To support the activities of the Joint Working Group on Fault Current Contributions from Wind Plants in the production of a report that characterizes and quantifies the short circuit current contributions to faults from wind plants for the purposes of determining protective relay settings and fault interrupting equipment ratings. The report will provide guidelines on the modeling and calculations for that purpose.

The C-17 Work Group met in a single session on Wednesday May 12 13, 2010 in Madison, WI with 21 members and 23 guests. One guest expressed interest in becoming a member.

The C-17 WG reviewed joint WG minutes from the January 2010 meeting in Orlando, FL, but could not approve because C-17 is not the joint WG.

The Working Group web site includes all the presentations provided at the WG meetings, along with other material of interest (33 documents as of 5/12/10). Today's presentation will be added to the web site. The present draft report will also be added to the web site.

Writing assignments for the report are due by June 27, 2010, before the PES meeting in July.

Dean Miller presented an analysis of a fault on a recent 138 kV line that serves a wind farm composed of 67 Suzlon S88 2.1 MW wind turbines (Type II). Sixty one of 67 units were on line at the time of the fault, though total generation was only 14.6 MW of the available nameplate capacity of about 128 MW. Dean used a detailed model that included each unit of the wind farm, except for the power factor correction capacitors. Both raw and filtered data were analyzed for both ends of the line for the B Φ -G fault about 8.6 miles from the interconnection station on an 11.9 mile line.

PacifiCorp has been using a particular equation for several years to convert induction generator constants to equivalent transient impedances, but has lost track of the original source. WG member Russ Patterson has that source and will provide it.

The wind farm actual source currents were compared to modeled results at three points during the 4.1 cycle fault. The subtransient reactance using equivalent synchronous data best matched fault and modeled data for relay performance. The transient reactance using the calculated value from equivalent asynchronous data best matched fault and modeled data for predicting breaker interrupting currents.

Several WG members asked for the data to perform additional analyses.

The next joint work group meeting will be at the PES General Meeting in Minneapolis, MN July 25-29. The next C-17 (separate) WG meeting will be in Berkley, CA September 13-16.

CTF3: Joint meeting with Power System Stability Controls Subcommittee

Chair: C. Henville

Vice-Chair: -

Output: Recommendation to the Subcommittee

Established: January 2010

Expected Completion Date: -

The group is discussing possible interactions with the Power System Stability Controls Subcommittee (PSSC) of the PES Power System Dynamic Performance Committee (PSDP) at the 2011 Joint Technical Committee Meeting. Three fields of activity of mutual interest were identified.

Application of System Integrity Protection Schemes (SIPS) or emergency controls to preserve system reliability. This topic is of interest to members of PSRC "C" Subcommittee on system protection.

Modeling of rotating machines and their associated protection and control systems. In addition, coordination of rotating machine protection with system and transmission protection systems. This area is of interest to members of the PSRC "J" Subcommittee on rotating machine protection.

Modeling of turbine controls and their impact on system protection schemes such as underfrequency load shedding.

It was agreed that there were benefits in cross education between the PSRC and PSSC with respect to their related activities. It was proposed to invite the PSDP and the PSSC to participate in at least a Monday session with the PSRC at the 2011 JTCM to facilitate discussion between the groups. A one day session could be divided into two parts. One would deal with application of SIPS and emergency controls, and the other with dynamic performance of rotating machines and interaction with protection and control systems.

The PSSC and PSDP would be able to pursue other items on their own agenda during the rest of the JTCM meeting.

The J subcommittee has approved the formation of a task force (JTF4) to develop a specific agenda for the possible joint meeting with PSDP. It was recognized that the activities of CTF3 and JTF4 were complementary, and for the May meeting of PSRC sequential meetings of these two task forces are requested.

CTF3 did not meet in May. The possibility of joint activities will be discussed by PSSC at the summer meeting in July. CTF3 will meet in September.

D: LINE PROTECTION SUBCOMMITTEE

Chair: M.J. McDonald

Vice Chair: Russ Patterson

The Subcommittee meeting was called to order at 11:00 am on May 13, 2010 with 31 members and 32 guests present.

After introductions, a quorum was verified with 75% of members present.

The January SC meeting minutes were approved without comment.

Attendees were advised to pay close attention to the Meeting Announcement details for the September meeting which will be following the "West coast" format where meetings begin early Monday afternoon and to plan travel/accommodations accordingly.

Chairs were encouraged to use methods such as 'webex' or conference calls between meetings to move their assignments along and thereby make efficient use of group meetings.

During WG reports the proposed assignments for D26 and D27 were approved by the SC with those assignments later forwarded to the PSRC Officers for approval before proceeding with their PARs.

Reports from the WG Chairs:

D2: Revision of C37.104 Transmission and Distribution Reclosing Guide

Chair: Gary Kobet

Vice Chair: Greg Sessler

Output: IEEE Guide

Established: September 2008

Expected completion date: 2012

Assignment: Revise and update the IEEE Guide C37.104 - Guide for Automatic Reclosing of Line Circuit Breakers for AC Distribution and Transmission Lines

Working Group D2 held its meeting on Tuesday, May 11. There were 14 of 22 working group members and 28 guests present. Nine of the guests joined the working group as new members, bringing total membership to 31.

The IEEE patent requirement slides were presented, and attendees were given the opportunity to identify any known patent claims.

The D2 meeting notes from the January, 2010 meeting held in Orlando, FL were reviewed and approved without modification. The chairman demonstrated access to the working group documents located on D2 WG secure area of the PSRC website, and indicated that login information has been emailed to working group members. The login information will be sent to all new members.

The chairman reviewed the working group Assignment, Scope and Purpose, and noted that the PAR for this working group expires on 12/31/2013. Copies of draft 1 of the guide were distributed to working group members.

Working group writing assignments were reviewed, with pending and new assignments noted on the latest version of the guide outline. Notable additions to guide include a section on synchrophasor applications, incorporation of information from the NERC SPCS document "Advantages and Disadvantages of EHV Automatic Reclosing", a section on autoreclosing following bus faults from information within the C37.234 Bus Protection Guide, integration of information from C37.117-Guide for the Application of Protective Relays Used for Abnormal Frequency Load Shedding and Restoration, and consolidation of information from throughout the guide on rotating machine impacts to autoreclosing on both transmission and distribution systems. In addition, Robert Frye will review a recent Georgia Tech conference paper on autoreclosing for inclusion of relevant information in the guide. He will also clarify and expand the definition of "normal after open", which is referenced in section 4 of the guide.

Also, working group members as noted on the outline volunteered to review sections 3, 4 and 5 to verify that all information from the original guide is included in the latest version, and that all recirculation comments are adequately addressed. The members reviewing sections 5 and 6 will also identify autoreclosing topics common to both distribution and transmission systems – these common topics will be consolidated into section 4 (autoreclosing fundamentals).

The working group discussed Smart Grid applications that may apply to autoreclosing. Charlie Sufana has provided a write-up on IEC 61850 applications on autoreclosing, which the group thought covered this topic sufficiently. No additional information will be included at this time.

Working Group members were requested to send completed assignments to the chairman prior to July 15, 2010. The chairman will provide an updated draft of the guide to all working group members by August 15, 2010.

D3: Considerations in Choosing Directional Polarizing Methods for Ground Overcurrent Elements in Line Protection Applications

Chair: Meyer Kao

Vice Chair: Elmo Price

Output: Report to the Line Protection Subcommittee

Established: September 2009

Expected completion date: Jan 2012

Assignment: Prepare a report to the Line Protection Subcommittee of the PSRC on identifying different polarizing methods, address issues related to the application of different methods, and make recommendations in choosing the polarizing method.

D3 working group held its meeting on Tuesday May 11, 2010 at 3:00 PM with 33 attendees, of which 15 are members of the working group

Minutes from the January 2010 meeting were approved with no changes.

The assignment of the working group was presented.

Writing assignments assigned from the previous meetings were discussed.

Two more sections were added to the report outline. One is on relays that can run multiple polarizing methods, depending on transient conditions. Another is on the effect of sensitivity of polarizing unit with an adjacent single pole opened line.

There was a discussion on relay running different polarizing methods at the same time and how it may lead to mis-operation due to the mismatch single polarizing method at the remote terminal.

Jeff Barsch discussed an example of mis-operation of a line terminal due to specific polarizing method.

Writing assignment was assigned on how much zero sequence mutual coupling is considered significant where it needs to be addressed in selecting a polarizing method.

Robert Frye will provide different zero sequence networks and their respective polarizing locations for different transformer configurations.

Writing assignments on inherently directional situation and examples of relay running concurrent polarizing methods were assigned,

Members and guests are encouraged to submit examples of polarizing problems that they have encountered.

In addition of previous assigned writing assignments, 4 new writing assignments were assigned. The writing assignments are due July 15th, 2010.

D6: AC Transmission Line Model Validation

Chair: Tony Seegers

Vice Chair: Sam Sambasivan
Output: Report to the Main Committee.
Established: January 2009
Expected completion date: TBD

Assignment: The WG will prepare a report to the main committee on the processes, issues, problems and methodology of validating software model parameters for AC transmission lines used for relaying. The report will not include details of relay curve models or other similar relay modelling. The report will also not include specific EMTP modelling.

The D6 working group met on Wednesday, May 12th, 2010 at 1.30 pm with 9 members and 11 guests present. The WG stands at 22 members. In the absence of the chair and vice-chair Ken Behrendt was acting chair.

Draft 1.0 of the document was sent to the members prior to the meeting, and hardcopies were handed out for the guests at the meeting. Members and guests were asked to comment on the latest draft.

Prior to the meeting, a suggestion was emailed to the working group to add a subsection to Section 2 to discuss the use of line modelling for fault location and fault analysis. The suggestion was to describe the calculation of fault location based on line impedance models and V and I measurements. The new subsection would also describe how various line models are selected for improved accuracy depending on line types and line length, etc. There were no objections to adding the suggested new subsection in section 2.

Normann Fischer made a presentation on his contribution showing how line parameters are calculated using line conduction size, material, and spacing. The presentation included a discussion of line impedance parameters for transposed and untransposed lines. Normann also presented his contribution showing how mutual impedances are computed for parallel line segments, including how the positive and negative sequence mutual impedance for untransposed parallel lines disappears when the lines are fully transposed (one line transposed every 1/3rd of its length and the other line transposed every 1/9th of its length). Normann also showed that transposing phases in the parallel lines has no affect on the zero-sequence mutual coupling. The working group agreed that it would be beneficial to include example impedance calculations in a report annex.

The latest draft does not include some contributions that members have sent to the chairman and vice chairman, so an effort will be made to find those contributions and get them included in the document. A more complete draft will be sent to the working group before the next meeting.

Meyer Kao asked about modelling and calculating cable impedances. There was discussion about the complexities of computing zero-sequence impedance for pipe-type cable because of the variations caused by saturation in the iron pipe. This was followed by a discussion about direct-burial cable and that the number and spacing of bonding grounds affected the zero-sequence impedance. It was agreed that we should include references to existing documents on the calculations required for cable impedances.

A request was also made to include the Omicron presentation about direct impedance measurement on the working group web page and in the document.

D9: Revision of C37.113 – Guide for Protective Relay Applications to Transmission Lines

Chair: Mohindar Sachdev
Vice Chair: Simon Chano
Output: Revised IEEE Guide C37.113
Expected completion date: 2010
Draft 3

Assignment: Revise and up-date the IEEE Guide C37.113 - Guide for Protective Relay Applications to Transmission Lines reaffirmed in 2004

The WG met at 3:00 PM on May 12, 2010 in Conference Room I, Concourse Hotel and Governor's Club, Madison, WI; thirteen members and eighteen guests were present. The minutes of the WG meeting held in Lake Buena Vista, FL could not be approved because of lack of quorum.

The patent slides were shown and those present were requested to report the copyright and patent issues that are relevant to the contents of this guide. It was decided that the Chair distribute the slides along with the minutes for reminding all members for the need to report copyright and patented material.

The Chair reported that he had received additional ballots from the WG members since the January 2010 meeting. There are still a few members who neither participated in writing the guide nor have provided comments on the draft. Those members will be contacted for the last time to provide their inputs failing which they will be invited to withdraw from the membership of the Working Group.

More than 700 comments have been received from the members. Most of the comments are editorial in nature and are for improving the clarity of the issues presented in the guide. The draft has been modified incorporating more than 600 comments. The remaining comments will be taken care of during the next three weeks and Draft 4 will be distributed for the WG members to provide their concerns of substance in a four weeks time. At the expiry of the four weeks period, the guide will be submitted to the Officers of the PSRC with the approval of the Subcommittee.

A few suggestions for including additional material in the guide have been received. The Chair pointed out that the outline of the guide was prepared in 2005 and it is now too late to modify the outline. Also, the PAR is going to expire at the end of 2010. The additional topics should be considered for including in the guide during its next revision.

Dr. Bogdan Kasztenny pointed out that the section on out-of-step protection should be condensed and reference to other documents on this subject that have since been published be added. He agreed to provide a revised draft of that section.

The relay setting examples included in Annex B are causing difficulties because different utilities use different practices. Also the examples that are now in the Annex are somewhat simplistic and can mislead the readers. He suggested that this Annex should not form part of Draft 4.

D11: Effect of Distribution Automation on Protective Relaying

Chair: Fred Friend

Vice Chair: Jerry Johnson

Output: Report to the PSRC

Established: January 2005

Expected Completion Date: January 2011

Draft 4.1

Assignment: Prepare a special report to the PSRC that describes the effect of Distribution Automation on Protective Relaying

The working group, chaired by Fred Friend, met on Wednesday with 7 members and 22 guests present, including 1 new member: Kevin Donahoe.

Minutes from the Orlando meeting were reviewed and approved.

The document was reviewed, discussed, and changed with input from the working group. The major sections requiring further review are:

Clause 5.0 - WG chair will correspond with Cheong Siew to clarify table

Clause 6.1 – Juan Gers will re-arrange the order

Clause 6.6.7 – Comments received from Wayne Hartman will be reviewed with Charlie Sufana.

Writing assignments and comments from working group members are due by July 15, 2010.

The working group chair will post the revised document by July 31, 2010 and all working group members will be encouraged to review the document.

D21: Support of IEC Standard for Distance Relay Characteristics

Chair: Alex Apostolov

Vice Chair: Alla Deronja

Output: IEEE/IEC Standard

Established: September 2006

Expected Completion Date: December 2010

Assignment: Provide an IEEE/PSRC technical input to the ongoing development of IEC Standard 60255-121, dealing with distance relays to standardize impedance relay characteristics, performance, accuracy, and testing aspects.

Working Group D21 met on May 12, 2010, in Madison, WI, in a single session chaired by Alex Apostolov with 5 members and 8 guests present.

The IEC TC95 Maintenance Team 4, which develops the IEC standard 60255-121, met in Beijing on April 26-29. Alex, Murty Yalla, and a couple of other working group members were present.

Thanks to everyone, members of the working group and Subcommittee D, who reviewed the standard and provided their comments. These comments, along with the comments received from Canada and other countries, were addressed at the MT4 team meeting in Beijing.

There were 54 pages of comments, many of them from USA and Canada. Any non-specific comments, which did not contain proposed solutions, were not accepted. Editorial comments were addressed by the MT4 chair, Murty Yalla. The MT4 team concentrated on the resolutions of technical comments.

Murty reviewed these resolutions for the technical comments made by the IEEE. Some highlights are presented below.

One of the comments, a subject of a big discussion, was type manufacturer testing based on steady state impedance characteristics. Although these tests are no longer adequate, they are included in the standard to accommodate traditional testing methods.

Another set of comments concerned CVT models for simulating CVT transients. CVTs are different among the vendors. The utilities should work with their vendors to create specific tests for their use.

Also, there were comments on tests on capacitance values and harmonics, the data for which is provided as an example in the standard. The working group suggested that COMTRADE files of the various tests described in the standard be included in an Addendum of the standard so the users can re-create them for their testing purposes.

Some vendors did not want to disclose data, citing proprietary information, although they were asked to describe relays' behavior, not their algorithms.

Murty will distribute the updated comments resolution document to the members of the working group as soon as it is available.

Murty plans to invite a couple of the MT4 European members, along with the MT4 members, who are also the members of this working group, to have a face-to-face discussion at the next PSRC meeting to address the IEEE comments, their resolutions, and concerns of the IEEE with the members of the working group.

The MT4 team has its next meeting in October in Seattle. The input from the PSRC meeting will be addressed at the Seattle meeting.

D22: Performance Testing of Transmission Line Relays for Frequency Response

Chair: Tom Wiedman

Vice Chair: Jun Verzosa

Output: Report

Established: May 2007

Expected completion date: May 2011

Assignment: Investigate the feasibility of defining a range of frequency and rate of change of frequency to be using in a performance specification for protective relaying functions. If this proves feasible then the WG will pursue the feasibility of developing a test process for transmission line relays subjected to off frequency disturbance including rate of change of frequency conditions during stressed system conditions.

The D22 working group met Wednesday, May 12, 2010 8:00 am at Madison Concourse Hotel with 8 members and 8 guests present. WG stands at 24 members. This was the WG's ninth meeting. Phil Tatro, NERC, joined the WG.

WG Chair presented a Comtrade Calculator program developed by Jun Verzosa. This program automatically creates Comtrade test files for the off-frequency/off voltage tests included in the WG report sections 10.1, 10.2, and 10.3. Joe Mooney, Phil Tatro, Norm Fisher, Ilia Voloh and Aaron Martin volunteered to review the capabilities of the Comtrade Calculator. They will provide their comments to Jun. There was some concern that the test scenarios have "smooth" transitions rather than discontinuities. Aaron Martin reported on the BPA testing progress. BPA has developed Comtrade files for testing as well. They have completed the security tests and are now working on the trip dependability tests. Georgia Power completed the tests on an electro-mechanical relay. They reported that the tests when completed without the use of Comtrade was extremely time consuming. The test results were provided.

D24: Transmission Line Applications of Directional Ground Overcurrent Relays

Chair: Don Lukach

Vice Chair: Rick Taylor

Outputs: Report to WG D9, PC37.113, Guide for Protective Relay Applications to Transmission Lines and Report to the PSRC

Established: May 2007

Expected Completion Date: September 2011

Assignment: Prepare a report to the Transmission Line Guide revision working group and PSRC on the justifications and application criteria for directional ground overcurrent relays

The working group met with 10 members, 12 guests, and 1 new member, for a total of 23.

The January 2010 meeting minutes were approved as submitted.

All writing assignments that were submitted by the members prior to this meeting were incorporated into Draft E of the report.

The mutual coupling section was discussed and will be revised to include additional examples. A reference to a Transactions paper, that described mutual coupling affects on instantaneous overcurrent relays, will be reviewed for applicable information for this report.

Ground source issues were discussed and will have a writing contribution submitted.

The Vice Chair discussed 50N and 51N setting philosophy stemming from some recent activities. Some of the information was thought to be a good candidate for an appendix.

The group discussed refining, or condensing, the report to normal applicable information and placing the extraordinary information to an appendix for better usability.

Members volunteered to write the remaining sections of the report: Ground Sources, Introduction, References, and Summary.

All writing assignments were requested to be submitted by July 15, 2010.

The requirements for the next meeting are a single session, meeting room for 30 people with a computer projector.

D25: Distance Relay Response to Distorted Waveforms

Chair: Karl Zimmerman

Vice Chair: Aaron Martin

Output: Technical Report to Line Protection Subcommittee

Established: January 2009

Expected completion date: January 2012

Latest Draft: 0.1

Assignment: Write a technical report to the Line Protection Subcommittee on the performance of distance elements with distorted waveforms.

The working group met in Madison on May 11 2010 at 1:30 with 9 members and 19 guests.

After introductions, we reviewed the minutes from January and reviewed the writing assignments that had been received – the first was a section on the performance of distance elements with transformer inrush. We discussed the possibility of adding system examples that demonstrate the performance of distance elements with inrush. We reviewed a paper that was recently presented to the group by Joe Mooney

We also reviewed a section on series capacitance and viewed a system event that showed a CVT transient and the distance element performance with and without automatic CVT detection logic.

The working group chairman requested examples of system events: transformer energization, CVT transients and other system events that show how a distorted waveform had an impact on distance elements.

D26: Revision of C37.114 Guide for Determining Fault Location on AC Transmission and Distribution Lines

Chair: Joe Mooney

Vice Chair: Randall Cunico

Output: IEEE Guide

Established: 14 Jan, 2010

Expected Completion Date: December 2010

Assignment: Update and revise C37.114: IEEE Guide for Determining Fault Location on AC Transmission and Distribution Lines to include new developments in fault location methods and techniques.

This was the inaugural meeting as a working group with 13 members and 13 guests in attendance, with Joe Mooney presiding.

After introductions, Carl Zimmerman, Chairman of the working group that developed the existing guide, gave a short presentation concerning the background of the development of that guide.

Joe Mooney and Mike McDonald discussed the reasons this working group was formed and the scope of the working group efforts.

It was decided that the PAR application scope will be the WG's assignment modified as follows:

Update and revise C37.114: IEEE Guide for Determining Fault Location on AC Transmission and Distribution Lines to include new developments in fault locating methods and techniques.

Next meeting's assignment is for all members to read the existing guide and be ready to discuss it. Also, look forward with ideas of new developments and technologies to include.

D27: IEEE Guide for Application of Line Current Differential Protection

Chair: Juergen Holbach

Vice Chair: Ryland Revelle

Output: IEEE Guide

Established: May 2010

Expected Completion Date: December 2014

Assignment: Create an IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication.

Working Group D27 held its first meeting on Tuesday, May 11, with 22 members and 22 guests present. Of the 22 guests, 8 indicated they would like to join the WG. Since we do not yet have a PAR, this meeting served as the only WG meeting we may have before we have an approved PAR.

The scope and purpose of the working group was discussed for the benefit of finalizing language for the PAR to be submitted.

The agreed language for the PAR will be "Guide for APPLICATION OF DIGITAL LINE CURRENT DIFFERENTIAL RELAYS USING DIGITAL COMMUNICATION."

The agreed scope for this WG was: Write a "Guide for APPLICATION OF DIGITAL LINE CURRENT DIFFERENTIAL RELAYS USING DIGITAL COMMUNICATION" to present practical line current differential schemes using digital communication including operating principles, synchronization methods, channel requirements, current transformer requirements and external time reference requirements; provide specific guidelines for various application aspects including multi-terminal lines, series compensated lines, mutual coupled lines, line charging current, in-zone transformers and reactors, single-pole tripping and reclosing as well as channel and external time sources requirements; include backup considerations, testing considerations and troubleshooting.

Next, Bogdan Kasztenny suggested that it would benefit the working group if a few presentations would be given to the WG outlining some of the basic challenges of implementing line current differential protection, especially related to the capabilities of the channel. This idea was discussed and generally agreed upon.

Shyam Musunuri has agreed to develop and present such material at the September meeting.

Ilioa Jankovic agreed to take a writing assignment for the application principles of applying LCD schemes to transmission lines and cables, and the effects of charging current on each application.

Pouria Naisani agreed to write a section pertaining to the application of LCD schemes to line with in-zone reactors and transformers.

Liaison Reports

None

Coordination Reports

None

Old Business

None

New Business

None

Transmission Line Operations of Interest

None reported

H: RELAYING COMMUNICATIONS SUBCOMMITTEE

Chair: V. Skendzic

Vice Chair: Eric Udren

The Subcommittee met on May 13, 2010 with 25 members of 40 total, plus 42 guests. This comprised a quorum. Minutes from the September meeting in Arlington were approved.

The Subcommittee welcomes Jeff Pond as a new member.

The SC Chair reminded WG chairs that they are responsible for making sure that scheduled meetings are held, and that the WG Vice Chair or another person is available to step in if the Chair is not available. Notify the SC leadership of problems to get a solution before the meeting.

Old business:

By SC vote, The WG H16 project *IEEE PC37.239™/ Draft Trial-Use Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems* is elevated to a full-use Standard draft. No members at the meeting objected, and one member abstained. This change supports fast-tracking the work for IEC acceptance via the dual-logo process.

By SC vote, the Task Force HTF3, *IEEE/IEC Joint Task Force for C37.118 and IEC 61850*, is elevated to Working Group H19, *Synchrophasor Data Transfer for Power Systems* for the September meeting. Ken Martin continues as Chair. No members at the meeting opposed the motion or abstained from the vote.

By SC vote, the WG H8 report *Schema for Phasor Data Using the COMTRADE File Standard* is approved for publication. No members at the meeting objected, and one member abstained. The SC Vice Chair obtained 3 additional SC member votes in favor via e-mail prior to the meeting. The PSRC officers have approved posting on the PSRC web site.

New business:

The SC leaders explained that it is now necessary to regulate the creation of new Task Forces. The number of meetings is beyond the bandwidth of the attendees; thin attendance and meeting conflicts hinder progress. WGs are encouraged to complete assigned tasks and disband to make way for new activities.

With this, the SC is establishing a pipeline of new Task Force projects – a queue that gives visibility to planned or requested activities. This helps with prioritization of new work. It also helps with solicitation of Task Force leadership and membership, and development of scope or assignment. With this advance planning, the TF can become instantly effective when created and can proceed more briskly into a WG project when the SC supports such an elevation.

The following proposals were described and are in the queue (not necessarily in this order):

- Alex Apostolov – Functional testing of IEC 61850 based systems.
- Eric Udren - Object definitions (items of information to communicate) for condition monitoring of protection systems (secondary systems). The objects are intended for incorporation in IEC 61850-7 (or other communications means) to support compliance with a NERC PRC-005-2 or other condition based (failure self-reporting) maintenance program for a protection system. A TF Chair is being solicited with Eric as a supporting technical contributor and guide.
- Amir Makki - C37.232-2007 is a *Recommended Practice* for Naming Time Sequence Data Files and thus not eligible for IEEE/IEC dual logo status. C37.232 has been gaining popularity and a good number of manufacturers from Europe support it. Accordingly we need a new task force to upgrade it to a full use standard. The task force, if created, could work electronically and not meet at PSRC in September 2010.

Reports from the WG Chairs

H1: Guide for Power System Protective Relay Applications over Digital Communication Channels

Chair: Marc Benou

Vice Chair: Ilia Voloh

Output: Guide

Assignment: Develop a guide for application of digital communications for protective relaying systems and schemes, including transmitting and receiving equipment, digital channels, application principals, performance, installation, troubleshooting, testing and maintenance.

The H1 working group met with 13 members and 3 guests. The meeting was chaired by Marc Benou and Iliia Voloh as vice chair. The agenda with the IEEE patent policy was also distributed.

The January meeting minutes were distributed and approved since a quorum was present. Draft 2.5 was distributed.

Mal Swanson led off the meeting by discussing words that may be added to the database including the term ST for fiber optic connectors. He will use the IEEE C37.94 guide for reference. Solveig Ward and Tom Dahlin will work with Mal before the next meeting for clarifications on several other words.

It was then announced that the current PAR will expire in December 2010. Since that is not enough time to finish our review and ballot the guide, the chairman has applied for a two year PAR extension. The status of the guide is that most of it has been written and the WG needs to review the document in earnest. It was urged to the group that while reviewing, to please consider not only editing and content but also to point out if the section discusses the pros and cons of that section and to point out any references or items for the bibliography. Also, to make sure all units are in metric units first and English units as an secondary option.

The following sections were reviewed in some way modified:

- Section 6, 7.2, 7.4.6
- Ken Fodero and Roger Ray were unable to attend and are asked to review sections 4 and 6 respectively to approve the changes that have been made to the sections they authored.
- Solveig suggested that a new section be added as 7.4.4.2 about Pink Noise and the current section 7.6 be moved to 7.4.5 as it should belong as a subsection of multiplexers. Tom Dahlin agreed to update Figure 26. Mal Swanson agreed to add the appropriate drawings to Section 8.
- We have assigned all the current sections to the WG for review and comment before the next meeting. The assignments are as follows:
 - Section 5, Current section 7.6(to become 7.4.5), and section 8 – Rene Midence
 - Sections 3, 4, 6, 7.2-7.2.4, 7.3 – Mike Stojak
 - Sections 3, 4, 6 – Sarah Bins
 - Sections 5.3, 7.4 – Johan Van den Berg
 - Sections 7-7.145, 7.8, 9 – Tom Dahlin
 - Sections 7.5, 10.1, 10.2 – Jim Ebrecht
 - Sections 7.7, 10 – Mark Simon
 - Sections 7.7, 9 – Benou
 - Sections 8, 10 – Ince
 - Section 9 – Solveig Ward

Anyone else willing to review and were not able to attend the meeting are encouraged to do so.

H2: Relay Applications Using the Smart Grid Communications Infrastructure

Chair: M. Simon

Vice Chair: TBD

Output: Report to the Subcommittee on title subject

Assignment: Create a working group report to the Relaying Communications Subcommittee that describes example protective relay applications that can make use of the communication infrastructure provided by the Smart Grid. Protective relay applications will include potential capabilities and the communication requirements necessary to provide suitable communication architectures, services, capabilities, and any other pertinent characteristics.

H2 met on Tuesday May 11th in Madison, WI with 13 members and 21 guests. 13 members were present and a quorum was achieved. There were no issues discussed during the WG meeting where consensus was needed.

The group reviewed the purpose, outline and proposed applications that will make up the bulk of the document. The chairman discussed in detail an example application called "Dynamic Settings based on Real Time System Conditions". Writing assignments were made for the remaining applications with a due date of August 1st, 2010. The completed application, outline and minutes will be sent out to the mailing list consisting of members and guests.

H3: Timetagging in Protection and Disturbance Recording IEDs

Chair: W. Dickerson

Vice Chair: J. Hackett

Output: Recommended Practice

Assignment: Develop a recommended practice for time tagging of power system protection event, analog, and derived data. This will include methodology for description of measurements and transport delays and for stating the resulting time accuracy.

The WG met on Tuesday May 11, 2010 with 12 members and 8 guests in attendance, 20 in total. We plan to ballot approval of the minutes of the two previous meetings (for which approval is pending) by e-mail.

We had another lively discussion about the scope and purpose and some of the terms used, most importantly the term "event" which has multiple meanings as understood by different people. Most people in the industry think of "power system event" when hearing the word 'event,' however in the context of a recording device, what is meant is normally the change of state of a binary input.

The term "event report" also refers to a file produced by some IED when they operate, another meaning of the term.

We will attempt to clarify our use of these terms, and if possible, seek better alternatives that will minimize confusion to the reader. Tony Napikoski will review the usage of terms in the documents to identify definitions required.

Proposed changes to the Scope, Purpose and Need statements are expected to result in request to revise the PAR

We plan to act on the previous request of WG members, to circulate the report of the I11 working group, since knowledge of this report and its conclusions is pre-requisite to an adequate understanding of the issues involved. This should lead to more efficient and productive use of the WG members' time and the limited time available at the PSRC meetings.

H4: Revision of C37.111 COMTRADE Standard

Chair: R. Das

Vice Chair: A. Makki

Output: Standard

Assignment: Revision of IEEE Std C37.111-1999 - IEEE Standard Common Format for Transient Data Exchange (COMTRADE) for Power Systems.

Meeting # 17 - The Working Group met on May 11, 2010 with 17 attendees (10 members and 7 guests). Two new assigned work were received. It was decided to add five Definitions in the Definitions section (2). Oscar Bolado confirmed the requirement.

It was discussed that Chair will include the definitions in Draft 9 and send to members on May 12, 2010 to get their approval by May 12 to send this draft to the H subcommittee chair as the final draft. Chair will request H subcommittee chair to get the approval from main committee to go for balloting by the IEEE standards association.

Chair also informed that TC95 of IEC is going to circulate the latest draft to member countries for comments. IEC is planning to adopt the revised standard. Comments from IEC will be available by end of August 2010. Marty Yalla is coordinating the activity for IEC comments.

Chair pointed out that it is important to expedite the editorial review and the balloting process so that comments from IEEE balloting group and IEC member countries can be discussed during the September meeting. An attempt will be made to complete the work by 2010 so that the document can be published by IEEE. This standard is one of the critical standard identified by IEEE SA for Smart Grid activity.

It was also discussed that H4 subcommittee may have teleconference meeting among members before September meeting and thereafter, if necessary, to expedite the completion of the work.

Chair requested all members and guests to participate in the balloting process to be organized by IEEE SA. Subcommittee members are also requested to participate in the balloting process.

Chair proposed that Eric Allen, Mark Taylor and Rick Cornelison be invited to join the working group as a member for their continuous participation and contribution to the working group activity. This motion will be accepted when this minutes is approved as there was no quorum during the meeting.

The WG will meet at Berkeley to review the comments from IEC members and IEEE balloting process.

H5-a: Common Data Format for IED Configuration Data

Chair: J. Holbach

Vice Chair: D. P. Bui

Output: Report

Assignment: Define a common format for IED configuration data.

The configuration data described in this common format should allow only one unique interpretation how they are used in a given application. The format must be powerful enough to convert any practical IED configuration into this format. The conversion from this common format into a specific IED configuration data set depends on the IED ability to support the described application requirements and may not be possible in all cases. The common format can be used to exchange IED data between different data sources and receivers. Sources and receivers can be IED configuration programs, net study programs, data bases, coordination programs and automated test programs.

The working group met on Wednesday the 12th of May in Madison, WI with 9 members and 5 guests. In the meeting all contributions received were discussed and included in the Draft 7.

The WG agreed that with the contributions received so far, most of the settings are covered and we should now start to write the final report with the goal to have it done before the next meeting in September. The WG will have monthly conference call to coordinate the writing assignments.

Alex Apostolov volunteered to revise all setting names and follow the IEC61850 naming convention.

The Chairman will generate an excel table including all standard settings with a cross reference to settings from different manufacturers' relays.

H6 Substation Ethernet

Chair: J. Burger

Vice Chair: C. Sufana

Output: Report

Assignment: Investigate user requirements and provide recommendations for relay peer-to-peer communications in substations. Develop and define practices for the application and testing of IEC 61850 based Ethernet protocol in substation LAN peer-to-peer applications.

Introductions were done after a welcome by Chairman John Burger. There were 10 members and 36 guests present. The minutes from the January, 2010 meeting were approved.

Herb Falk gave an update on the status of IEC-61850. Part 8.2 edition 2 going through a 2 week review. Part 6 is now an international standard. Parts 7.1, 7.2, and 7.3 have been sent to Geneva. At the Tampa meeting at the Joint Task force met about synchrophasors. A migration plan has been put into place. The Synchrophasor standard C37.118 now has 2 parts; a measurement and a communication part. Gap analysis between C37.118 and 61850 going on now. Part 90-5 should have enough to be set up to be international standard. EPRI is going to have a draft version about CIM and 61850 for public release due to smart grid on how to harmonize the two. TC 57 Group 19 is to have a task force to look at the details; there is some debate as to if a unified model or harmonized model should be supported.

Alex Apostolov gave short update on WG 10. A condition monitoring task force has been formed and logical nodes being added. The Task Force is looking at the network architecture. Functional testing is another task force; there are issues on how to test and the impact on quality bits that are being investigated. In the future, it may be possible to eventually eliminate testing; as monitoring takes nothing out of service, introduces no testing errors, etc.

Stan Klein indicated that the second public draft was issued for NISTIR cyber security 7628 and is out for comment. Version 1 may be issued in the June/July timeframe. The Homeland Security catalog of security concerns is being modified to address electric power. Work is proceeding on looking at standards to see if there are gaps. IEEE Standard 1686 is being looked at on a section by section basis. Questions such as

what power system equipment can help to determine if there is a security issue and what information is needed with what level of confidentiality are being addressed.

Joe Hughes next gave a quick update Priority Action Plan (PAP14) that covers Transmission and Distribution Power Systems Model Mapping. He also briefly discussed PAP1 which is the Role of IP in the Smart Grid.

Drew Baigent gave a talk on Maintenance Considerations in IEC 61850 Protection and Control Applications. There are technical testing concepts built into IEC61850. Drew explained why there is a need for maintenance indicating that there are technical reasons, as well as federal and regional requirements. Drew then covered what you need to do to actually do a test. This includes isolating inputs, inject signals, verification, making sure that the equipment is put back in service correctly. There is even a need to examine the Ethernet network. He then went through the various parts of IEC-61850 where testing is discussed. This includes:

- IEC61850-4: this part mentions testing and the need for test equipment.
- IEC61850-5 requirements: this part covers the configuration and maintenance functions. Test mode is discussed as well as the need to block controls during testing. The real inputs are to be used but the outputs need to be blocked.
- IEC61850-7.4 logical nodes and data: this part discusses Mode and Behavior and has these available conditions on, blocked, test, test/blocked, and off.
- IEC61850-7.3 common data classes: test is a quality attribute.
- IEC61850-7.1 principles and models: this part discusses the grouping of logical nodes into a logical device. Normally everything is switched together into test.
- IEC61850-7.2 Communication services GOOSE services: includes a Test Boolean value in the header. If it is true then it is not used for operational purposes. This mode applies to all data in the GOOSE message. The control services client must send a Boolean TEST value. There is a substitution model where measured process values are substituted with non-process values.
- IEC61850 edition 2 is currently being developed and includes clarification for testing.

For GOOSE services, a test is now called Simulation.

There are many real world questions that would need to be answered to run a test that include the following:

- Block output
- Block or force relay input
- How should the device be isolated? One could unplug the cable but that introduces many other issues.
- One could use the IEC61850 test features, but these issues get raised:
- How can one make sure the relay is in test? How do you know the relay is no longer in test?
- GOOSE Test is true, do you trust it? GOOSE Test is false, do you trust it?

H7 IEEE 1588 Profile for Power System Applications

(Joint Working Group of Substations Committee C7 & PSRC H7)

H7 Chair: Galina Antonova

Substations C7 Chair: Tim Tibbals

Vice-Chair: Bill Dickerson

Output: Standard

Assignment: Develop an IEEE Standard "IEEE Standard Profile for Use of IEEE 1588 Precision Time Protocol in Power System Applications" in close coordination with IEC TC57 WG10 and other technical committees with similar interests.

Joint WG H7/Sub C7 met on May 12, 2010 in Madison, WI in a double session with 36 attendees (19 members and 17 guests). Four attendees (3 members and 1 guest) participated by calling in and on-line meeting. After introductions, Galina presented IEEE Patent Policy slides and asked to bring up any patent issues. None were identified. Minutes of January 2010 meeting were approved electronically.

Discussion on PC37.238 Draft 4.0 followed. The group completed the review of sections up to Annex C and scheduled a call/on-line meeting on Wednesday, May 19, 2010 at 15:00 CDT (European) to continue draft review.

Galina presented to the group that IEEE / IEC Joint Development process was suggested for integration with IEC. The group agreed to have a conference call on this topic.

H8 Application of COMTRADE for Exchange of Synchrophasor Data

Chair: E. Allen

Vice Chair: J. Ingleson

Output: WG Paper

Assignment: Develop a paper on issues related to the use of COMTRADE for exchange of Synchrophasor Data. Develop a profile (scheme) to use COMTRADE for this purpose. Report on other formats that have been used such as ".dst". Address issues that would arise in converting .dst and other formats to COMTRADE.

This WG met on May 11 at 11:00 AM in Madison, WI. 8 of 15 Members were present. There were also 22 guests, for a total attendance of 30.

The Schema revisions which were approved by the WG at the previous meeting (January 12) were presented to the H Subcommittee on January 14 but have not yet been approved. Approval will be requested at the upcoming H Subcommittee meeting on May 13.

(Note in SC H minutes above that the schema was approved on May 13.)

Krish Narendra discussed the synchrophasor COMTRADE sample files sent by Ken Martin. The COMTRADE sample file was successfully opened with one of the ERLPhase viewers, but the analog channels have some issues – the units are kPU, and the data has some scaling problems. Krish will be further looking into these issues and will send the feedback to Ken Martin in a couple of weeks. Mark Taylor requested Ken Martin to send a sample file with a large amount of data (few minutes- MB size) to check the consistency of the large phasor data. Ken will follow up on this.

At a previous meeting Shane Haveron offered to draft a scope for testing the profile. This is continued until the next meeting.

Following are status reports on various assignments having to do with the publicizing of this Schema:

The deadline for submittal to the next Texas Relay Conference is not yet posted but will likely be in August 2010. This submittal should be coordinated with Mladen Kezunovic.

Eric Allen had requested an announcement before the full conference of the February meeting of the North American SynchroPhasor Initiative (NASPI); however, that request was denied. Eric Allen will follow up with Alison Silverstein for making an announcement at the next NASPI meeting.

The GA Tech presentation was given by Jim Hackett. (Bob Cummings was unable to attend due to flight cancellations.) The presentation appeared to be well received, with several questions asked.

Mark Adamiak is planning to present the schema at the PAC World conference in Dublin in June. Shane Haveron may also attend.

Receipt of an abstract was confirmed for the Western Protective Relay Conference (WPRC). Eric Allen is the corresponding author. Eric Allen expects to be able to make a presentation in October if no other WG members are able to attend.

The following members will work on a paper describing background of this work and current status of testing: Eric Allen, Ken Martin, Mark Adamiak, and Jim Ingleson. This could be submitted to PAC World.

A new draft of the COMTRADE standard has not yet appeared; therefore, there is still an opportunity to include the January 12 schema revisions with H Subcommittee approval as an informative annex of the new COMTRADE standard.

H9 Understanding Communications Technology for Protection

Chair: M. Sachdev

Vice Chair: R. Midence

Output: WG Paper

Assignment: Prepare a document that would assist engineers in understanding the communications technology for protective relaying.

The Working Group H09, Understanding Communications Technology for Protection, met in Senate Room, Madison Concourse Hotel and Governor's Club, Madison WI, USA on May 12, 2010. Eleven members and ten guests were present. The notes of the previous meeting were approved.

Status of the Report: The new Draft No. 4 and the list of contributions received were reviewed. A list showing the status of the missing sections was presented and discussed. In addition, the list includes the 23 sections of the new document with the purpose of requesting volunteers to read-proof the document. During the meeting, René Midence made a brief presentation about the content of some of the sections of the Report and provided a detail status of all the sections.

The Chair requested volunteers to review the document for consistency. Volunteers were identified for this task during the meeting, as follows:

- Lizzette Castro to help organize and put together the references as well as general comments.
- It was agreed that expected content for sections 16.5 and 16.7 should be included in the introduction. René Midence to provide contribution.
- Volunteers were identified to provide additional content, and most importantly to read provide comments. A list will be distributed via electronic mail to all the participants.

Target Date: New contribution and comments are due on June 30, 2010.

Future Plan: The final draft of the document will be ready for the September 2010 meeting. The document may be ready for ballot after the meeting of January 2011.

H10 Naming Installed Intelligent Electronic Devices (IEDs)

Chair: R. Cornelison

Vice Chair: J. Hackett

Secretary: A. Makki

Output: WG Paper

Assignment: Create a PSRC Report that describes a convention to uniquely identify (name) installed Intelligent Electronic Devices (IEDs) including measured and calculated quantities for the purpose of sharing data collected by these devices.

The Working Group met on May 11, 2010 with 7 members and 4 guests.

A submission by Lars Frisk was accepted for inclusion in the report and the applicability of aspects of IEC 61850 and IEC 81346 was reviewed.

All assignments have been submitted and all outstanding issues resolved with the selection of the outstanding delimiter.

We plan to circulate the final report to the Subcommittee prior to the September meeting. The final meeting of H10 is planned to be in September.

H11 C37.118 Standard for Synchrophasors for Power Systems

Chair: K. Martin

Vice Chair: B. Kasztenny

Output: Standard

Assignment: Revise the IEEE Synchrophasor standard, C37.118-2005, by adding measurement extensions, communication harmonization, and other improvements according to the PAR issued 27 March 2008.

WG H11 met on Wednesday, May 12, 2010 in a double session with 14 members and 29 guests. The participants were reminded of the applicable IEEE intellectual property rules. The January meeting minutes will be approved electronically.

Bogdan Kasztenny gave a brief overview of the WG activities after the January meeting, including the two task forces on splitting the standard and developing the reference algorithm annex.

Veselin Skendzic explained the plan to elevate the HTF3 into the WG with the assignment to develop the C37.118.2 standard and liaise with the IEC TC57 WG10.

Herb Falk presented a brief overview of the proposed implementation of synchrophasor communications, PMU configuration and PMU commands in IEC 61850, based on the latest refinements during the IEC TC57 meeting in Florida earlier this year. This work will be undertaken under IEC 61850-90-5 and will be published as a binding "Technical Report". Herb indicated a target timeframe for development of about 1 year.

Jay Murphy presented the recommendation of the TF assigned to investigate the merits of splitting the existing standard into measurement (.1) and data communication (.2) parts. An electronic vote took place before the meeting approving this step. Ken Martin already submitted the two separate PARs that are awaiting SA approval in June. Jay Murphy indicated a need to share this information with the IEC Advisory WG and other parties interested in C37.118 (NASPI, TC57, NIST, etc.).

Galina Antonova made a proposal to clarify the accuracy ranges for the existing time quality bits, removal of the 0000 as a value denoting locked clocks and making this combination of quality bit invalid/reserved, and using the existing bit 13 as an indication for time being traceable to UTC. This is to facilitate harmonization between the IEEE 1588 time distribution standard for power applications and C37.118. Bogdan made a suggestion to define the term "traceable" in the standard to avoid confusion. A quorum was checked and a vote was taken to approve the proposal. It was approved with 14 YES, 0 NO and 0 ABSTAIN votes.

Veselin Skendzic delivered a presentation summarizing the progress of the reference algorithm TF and recommendations for the performance requirements. A copy of the presentation will be distributed after the meeting. Comments have been solicited from the WG members by 15 June 2010.

A new TG has been established to propose a table of contents and other edits for the C37.118.1 standard. The TG consists of Gustavo Brunello, Jay Murphy, Abu Zahid, Yi Hu, and Ken Martin.

H12: Configuring Ethernet Communications Equipment for Substation Protection and Control Applications

Chair: E.A. Udren

Vice Chair: J. Gould

Output: WG Report

Assignment: Develop a report to assist protection engineers in configuring Ethernet LANs and networking equipment when the network traffic includes critical protection messaging such as IEC 61850 GOOSE messaging. Topics include switch and router configuration, VLANs, security, priority queuing, traffic monitoring and control, and topology choices and redundancy.

The Working Group met on May 12 with 8 members and 16 guests. Attendees reviewed Draft 8 of the WG paper, with new additions and editing. The draft has a full body of material with just a few identified spots to fill in. It still requires some additional editing and coordination.

The WG reviewed the draft and identified remaining assignments, to be handled by volunteers in attendance. Draft 8 is circulated after the meeting for WG review and these additions.

Report work topics:

- Items still missing as identified in Draft 8.
- IPv4 versus IPv6 words – Joe Gould and Rene Midence.
- IEEE 1588 impact, advantages and disadvantages.
- Ask Ken Martin for words on synchrophasors over Ethernet.
- Siemens' Layer 3 failover – Joe Gould.
- See IEC 61850-8-1 Edition 2 draft – points to IEC 62439-3 on redundancy.
- Write up LACP failover used between switches and routers previously (Craig Preuss).

H13 Understanding Requirements and Applications of the Substation Cyber Security Standards (Joint Working Group Substations Committee C1 & PSRC H13)

Chair H13: Steven Kunsman

Chair C1: Sam Sciacca

Vice Chair H13: Tuan Tran

Output: Standard

Assignment: Prepare a standard on "Cyber Security Requirements for Substation Automation, Protection and Control Systems." This document provides technical requirements for substation cyber security. It presents sound engineering practices that can be applied to achieve high levels of cyber security of automation, protection and control systems independent of voltage level or criticality of cyber assets. Cyber security includes trust and assurance of data in motion, data at rest and incident response.

The WG H13 meeting was held on Wednesday, May 12th with 24 attendees, 10 members, 14 guests, and 1 requested to be a member. Tuan Tran opened the meeting in place of Steven Kunsman who could not attend.

Discussion about the need for the new standard and whether there is duplication with other documents. No quorum, so minutes could not be approved. Minutes to be distributed by e-mail for comment and approval.

Stan Klein gave an update on NISTIR 7628 document.

Markus Braendle described the activities of the workshop that took place on Feb 17th in Piscataway, NJ. He presented the analysis spreadsheet in which the different types of interfaces as presented in the NISTIR document were categorized according to their applicability and critical impact. Also he presented the actors/interfaces diagram based on the whiteboard diagram that was captured from the NJ meeting. The output from that meeting is a draft for the standard based on the NISTIR document.

Discussion about the best way to move forward – should we take DHS catalogue and use it to create the details in IEEE standard or create IEEE standard based on our own views and inputs which we can then compare (map) to DHS catalogue. The feeling was that we could use DHS catalogue as a ‘checklist’ but also add any additional scenarios not covered in the catalogue. These could then be used to update the DHS catalogue.

It was also pointed out that other standards, such as IEEE1686 and IEC62351, will also form a major part of the new standard by reference at least.

Review of the outline of the draft standard took place. Contributions for the writing assignments were requested.

Stan agreed to review portions of DHS catalogue to extract the substation relevant sections which can be used to create part of the content of the new standard.

H14 Revision of C37.115 Message Communications Between IEDs

Chair: J.T. Tengdin

Vice Chair: TBD

Output: Standard

Assignment: Recommend whether C37.115 is to be revised or retired.

The H14 WG met on May 12, 2010 with four members (Craig McClure, Stephan Thompson, Tim Tibbals, and John Tengdin) and two guests (Matt Ceglia and Phil Winston) present. This was not a quorum, so no official WG business could be conducted. An analysis of the performance test for IED communications, as developed by the UCAIUG, was presented by Tim Tibbals and discussed. The consensus was that this is an interesting test, but it does not measure “application to application” time as defined in C37.115. On the other hand, it can be used to compare the communication performance of IEDs communicating via its prescribed set of IEC 61850 GOOSE messages. The chair was tasked to find out if the UCAIUG had any interest in converting their document into an IEEE standard. After the meeting, the Chair contacted Bruce Muschlitz, who chairs the WG within the UCAIUG that prepared this test method. His reply was that it is too soon to consider such a conversion. This test method was just finalized last week, and there has been no opportunity to see if its concepts are workable.

However, upon further review, we must conclude that the UCAIUG test method has no ability to do the comparative performance testing of the scenarios now described in IEEE C37.115.

The WG must now return to the basic question – should IEEE C37.115 be revised, withdrawn or simply allowed to expire. At the moment, there is no candidate test method that has been identified that could be used for performance testing of these scenarios. We will conduct an e-mail poll of the presently listed members (12) of the working group to again seek a candidate test method and present our findings to the Subcommittee chair within 60 days.

H15 Coupling Redundancy for Protection Systems Using Power Line Carrier

Chair: R. Ray

Vice Chair: TBD

Output: Paper

Assignment: To develop a working group report that discusses the various coupling schemes for power-line-carrier systems and the coupling schemes ability to provide for redundancy.

H15 did not meet at the May 2010 meeting.

Roger is going to complete cleanup of draft 4, making the final copy draft 5 for submittal to the subcommittee. The Chair may cancel the September meeting if there is a determination that the document is completed.

H16 Common Format for Event Data Exchange (ComFEDE)

Chair: M. Adamiak

Vice Chair: P. Martin

Output: Standard

Assignment: Define a standard for a common format for the data files needed for the exchange of various types of power network events.

The flexibility provided by digital devices in recording network fault event data in the electric utility industry has generated the need for a standard format for the exchange of data. These data are being used with various devices to enhance and automate the analysis of power systems and related protection schemes during fault and disturbance conditions. The Working Group will define a standard for a common format for the data files needed for the exchange of various types of power network events.

The WG met on May 11 to discuss the results and comments of the just balloted document and the results are as follows:

- 113 in the Ballot group
- 86% responses
- 18% Abstentions
- 100% Affirmation
- 33 comments (mostly, the shortening of the names of various data items)
- 9 post-close comments (again, name changes)

All comments were reviewed resulting in a few additional changes to the document. The active draft is now version 0.5 – which is what will be submitted to IEEE for recirculation.

At present, the document is registered as a Trial Use standard. In discussion with several individuals, it was identified that there were several advantages of having the document elevated to full-standard status, specifically:

- The document could be submitted to IEC for dual-logo adoption.
- NIST could list COMFEDE as a full standard – which is being driven by PAP 14.
- Revisions could still be effected through addendums and corrigenda.
- In the transition time from Trial-Use to Full Standard, the “Trial Use” version is pulled from the IEEE standards library.

The available WG members were polled and 8 out of 14 have agreed to elevate the document to a full standard. Permission has been requested by the SC to proceed with the raising of the document from Trial Use to Full Use Standard.

(Note: As described in H SC minutes above, the Subcommittee approved this request on May 13.)

In addition, work began on a summary paper and presentation.

H17 Establishing links between COMTRADE, IEC 61850 and CIM

Chair: C. Brunner

Vice Chair: A. Apostolov

Assignment (draft): Develop a standards approach to link IEC 61850, CIM and COMTRADE so that the COMTRADE channels can be associated to a node in the power network.

The May 12 meeting was attended by 27 people – 11 of which were members or expressed interest to become members. The meeting started with the introduction of attendees. It was followed by a brief description by Christoph Brunner on the assignment of the working group.

IED naming may be considered in the report.

Discussions followed on what is the scope of the group. Should it apply to existing COMTRADE files or should it apply to a possibly required future revision of COMTRADE that has XML based configuration file? Conclusion was that if possible it shall apply to both but this will need to be investigated as part of the report.

It was decided to use the IEC 61850 view of the model, since the existing CIM model does as an example not support the concept of a phase. So the link will be established COMTRADE – IEC 61850 – CIM.

Christoph presented then some ideas on the outline of the report.

At the end of the meeting a use case was discussed – mapping of COMTRADE file channels in an automatic way.

Assignments were discussed at the end.

- Christoph will do introduction on IEC 61850.
- Herb will do introduction on CIM and Harmonization CIM / IEC61850.
- Benton will do introduction on COMTRADE.
- Alex will do a description of a use case –including physical and virtual channels.

H18: Cyber Security for Protection Related Data Files

Chair: Amir Makki

Vice Chair: Stephen Thompson

Output: Report

Assignment: Develop a report on security for data files used for configuration, management, and analysis of protective relaying systems.

The H18 working group met for the first time on May 12th, 2010 with 9 members and 10 guests present. Introductions were made and in turn each attendee gave a 2 to 5 minute talk about their opinions regarding the need to secure protection related data files. Their opinions covered all of the colors of the rainbow starting with “there is no need for such security” and ending with “it is critical to have tight security”.

In the end, the group agreed that the issue of security for protection data files needs to be addressed by the H18 working group in the form of a report and especially so because the issue is not being addressed by any of the standard development bodies at IEEE, IEC, and NERC. The group also agreed that this is a significant issue because such data files include relay settings, access parameters, and fault records (all of which are critical and are often submitted in legal proceedings).

Stan Klein provided a presentation on technologies used for securing XML files and recommended they be used for the report. After a short round of discussions, the group composed the assignment statement as noted above. Steve Thompson volunteered to take a leadership position as the Vice Chair of the working group, Stan Klein was assigned as the subject matter expert, Tony Giuliante was assigned as the group’s advisor, and Mark Taylor was asked to note the minutes as secretary of the group.

HTF3: IEC/IEEE Joint Standard for Synchrophasors for Power Systems

Chair: K.E. Martin

Assignment: Initiate the joint work between the IEC and IEEE in the development of a joint Synchrophasor standard.

The working Group met on Wednesday May 12, 2010 with about 35 members and guests.

The task force was briefly updated on the IEC TC57 WG10 meeting in Tampa in March. A more complete summary was done by Herb Falk at the WG11 meeting in the morning.

The split of C37.118 was introduced along with the plan to assign 37.118.1 to WG11 and assign 37.118.2 to a new WG formed from HTF3. The task force then voted unanimously to establish a formal WG from the task force.

(Note: At its May 13 meeting, SC H approved the elevation of HTF3 to WG 19, responsible for C37.118.2. WG 11 remains responsible for C37.118.1)

The PAR was reviewed. It was found that there were a number of references to protocols and communications which are not the same as the data transfer described in 37.118. Ken will edit and distribute a revision with these revisions of the PAR before submitting to IEEE.

The chair asked for nominations for chair of the new WG. Ken Martin was nominated for chair and Herb Falk and Gustavo Brunello were nominated for vice chair. Names will be submitted to the PSRC leadership for selection.

An editing group was formed including Herb Falk, Krish Narendra, Abu Zahid, Jay Murphy, Gustavo Brunello, Rene Midence, Mark Peterson, and Ken Martin.

Items to include into new standard were discussed, particularly the place for the timing requirements.

Liaison Reports

PES Substations Committee

J.T. Tengdin for C. Preuss

The Substations Committee will be meeting next week, and will address the suggestions from PSRC regarding possible additions or revisions to C37.2 Device Function Numbers. At this time, the proposal to make this a dual logo standard is stalled at IEC. An informative History Annex to IEEE 1613 is ready for ballot – an extension of the History Annex, and a similar annex is in the latest draft of IEEE C37.90.1 Oscillatory and Fast Transient Tests. Balloting is complete for the approval of DNP3 as an IEEE standard. From start to finish, and with great support from IEEE SA staff, this was accomplished in less than six months – including three recirculation ballots.

PES Communications Committee

S. Klein

No report.

IEC TC57, WG10, 17, 18 and 19

C. Brunner

IEC TC57 / WG10 is currently working on the following topics:

(3) Preparation of Edition 2 of IEC 61850:

A first group of parts are already published or close to publication as Edition 2. These include the following:

- a. Part 6 (configuration language) and 7-4 (Logical Nodes) has been published as IS. They already include the updates for substation to substation communication.
- b. Part 7-2 and 7-3 are ready to be circulated as FDIS. Parts 7-1, 8-1 and 9-2 will be submitted as FDIS within the next two month. These parts are expected to be published this fall.
- c. Part 4 (System and project management) has been approved as CDV. FDIS will be prepared following the WG meeting in June.
- d. Work on the remaining parts (1, 3, 5 and 10) has started,

(4) There are different task force working on preparing technical reports:

- a. IEC 61850-90-3 – using IEC 61850 for condition monitoring
- b. IEC 61850-90-4 – network engineering guidelines
- c. IEC 61850-90-5 – using IEC 61850 to transmit synchrophasor data according to IEEE C37.118. This is a joint work with IEEE PSRC HTF3.

(3) We planned to start working on functional testing. A document will be circulated to ask for additional experts for that topic.

(4) A report on the requirements for a future web based publication of the models defined in IEC 61850 will be circulated.

(5) As new activities, it was suggested to start working on modelling of logics in IEC 61850.

IEC TC57 / WG17 is working on extending the models for distributed energy resources in particular adding photovoltaics. A task force was created that shall prepare a technical report about the use of IEC 61850 for Distribution Automation.

IEC TC57 / WG18 is preparing IEC 61850-7-510: use of the logical nodes defined in IEC 61850-7-410 to model applications for the control of hydro power plants. WG 18 is as well starting to prepare the second Edition of IEC 61850-7-410. That work is focused on refining the different details of the logical nodes based on experience with first implementation considerations.

I: RELAYING PRACTICES SUBCOMMITTEE

Chair: R. Beresh

Vice Chair: J. Pond

The I Subcommittee met on May 13, 2010 with 23 members present – a quorum was achieved.

- Approved minutes of I SC meeting held in Orlando January, 2010.
 - Motion made by Mal Swanson; Second by Eric Udren

Reports from the WG Chairs

I2: Terminology Review

Chair: Mal Swanson

Vice Chair: Fred Friend

Output: Definitions for C37.100 and IEEE Std. 100

Assignment: Review drafts of PSRC publications for proper terminology, abbreviations and symbols; and to recommend additions and changes to the IEEE database as appropriate.

The I2 working group, chaired by Mal Swanson, met on Tuesday, May 11, 2010 with 7 members and 4 guests present.

Minutes from the Orlando meeting were reviewed and approved.

Liaisons have been assigned for all working groups with a PAR to facilitate the development of new terms during the working group process. Reports were given on the status of each.

Words from the last 4 Standards and Guides with a Section 3 (Definitions) have been incorporated into the IEEE database. An alphabetical listing of the words not in the database, but useful to the PSRC have been posted on the web site under "TERMS" link.

I3: Relay Functional Type Testing

Chair: Jerry Jodice

Vice Chair: Bryan Gwyn

Output: Report

Assignment: "A series of functional tests that could show a particular problem related to system events. Individual problems will be submitted by members of the Working Group and a test report developed for that issue. The individual test reports will then be collated into a Working Group report

Jerry and Bryan were not able to attend this meeting, but it was lead by Bob Beresh in their stead. A lot of interesting discussions occurred on various issues related to this WG and it was felt that a first draft of the document should be prepared for review by September. It was also felt that the number of issues submitted could easily balloon to a large number and that it was better to try and consolidate what we have now and start with that. Rick Turner agreed to have his submission in my mid June. Mladen Kezunovic agreed to send in a submission on a generator tripping event which was caused by transformer excitation current. The WG was concerned about making everything fit a common format and it was suggested that we carry on with the variegated formats for now. We were also reminded that the submissions should focus on functional testing and how this can avoid undesirable issues/events.

I4: IEC Advisory Working Group

Chair: E.A. Udren

Vice Chair: M. Ranieri

Output: Comments and votes to USNC of IEC on TC 95 (Measuring Relays) Standards projects and drafts. Reports to PSRC on IEC standards development.

Assignment: Analyze the work of IEC Technical Committee 95 to foster understanding and rationalization of IEC versus IEEE relaying documents. Aid in the formulation of U.S. positions on IEC voting documents. Report on IEC relay standards activities to the subcommittee.

The WG met with 6 members.

The WG met on May 11, 2010 with 15 attendees and discussed recent TC 95 documents:

- 95/260/DC - Proposed revision of IEC 60255-27, Measuring relays and Protection equipment – Part 27: Product safety requirements. Over 30 technical issues came up during FDIS voting, so a revision project will begin sooner than it will normally occur.
- 95/261/RVC – 60255-127: Functional requirements for over/under voltage protection – has been accepted and will be issued as an international standard.
- 60255-121 - Functional requirements for distance relays – WG, PSRC, and USNC submitted 30 pages of compiled comments. Murty Yalla is arranging a special meeting at the Berkeley PSRC meeting in September for IEC MT4 representatives and US commenters to resolve issues.

Development of functional standards is today's significant area of TC 95 standardization. Murty Yalla leads Maintenance Team MT4 of TC 95 that works on these and provided background information.

- 60255-151 - Functional requirements for overcurrent relays.
 - FDIS approved
- 60255-127 - Functional standard for over/under voltage protection – CDV had no negative votes, so IEC skipped the FDIS step and standard is approved.
- 60255-149 – Functional standard for thermal relays – to update 60255-8 – a WG has begun a skeleton draft.
- 60255-187-1,2, 3 family of standards - Functional standard for biased or percentage differential protection – to update 60255-13
 - -1 – Generator and transformer diff relays – end of 2010.
 - -2 – Line differential relays - later.
 - -3 – Bus differential relays – later.
 - We might expect tests under a full range of operating conditions as is now being developed for 60255-121.

Jodi Haasz gave an update on IEEE and IEC joint activities in support of Smart Grid standards needs:

- C37.111/60255-24 COMTRADE – the completed draft revision from PSRC WG H4 has been completed by WG and will be circulated to IEC member countries on a fast track for approval of the IEC version.
- C37.118 Synchrophasor Standard – to achieve compatibility with IEC standards organization, PSRC is splitting into C37.118.1 measurement part, that can be dual logo or dual standard when completed. There will be a separate C37.118.2 communications part that will make minor fixes to existing C37.118 communications; IEC TC 57 WG 10 has already started working on in IEC 61850-90-5 transport services for synchrophasor values that would become the ultimate international solution based on Ethernet.
- C37.239 COMFEDE common format for event data exchange – has been a Trial Use Standard in its PAR, but was just elevated at SC H to full standard so it can be tracked for IEEE/IEC dual logo.

The Chair gave Christoph Brunner's update on TC 57 WG 10 developments for IEC 61850 – see liaison report under SC H.

15 Schematic Representation of Power System Relaying

Chair: Kevin Donahoe

Vice Chair: Rich Young

Output: Report

Assignment: Report on common practices in the representation of protection and control relaying. The report will identify methodology behind these practices. Present issues raised by the integration of microprocessor relays and the internal logic and external communication configurations. Detail approaches to these issues.

Minutes of Meeting #7: 5/12/2010 13:30

The Working Group met at 1:30 pm on Wednesday, May 12 in a single session with 12 members and 17 guests attending. John Csisek was added as a member.

Chairman Kevin Donahoe welcomed attendees and introductions were given. He reminded everyone that, although this WG will not be producing a standard, proprietary information may be shared during the course of our work, so it is important to keep the Standards Board Bylaws on Patents in Standards in mind.

Karl Zimmerman presented a summary of a paper he wrote with David Costello concerning lessons learned from commissioning protection systems. Commissioning is the final check on quality before a project goes in service, so it needs to be a separate line item in the project budget. The paper offers a fault tree analysis of all the aspects that make up a protection scheme and showed that just eliminating wiring errors and application errors can lead to significant reduction in the probability of failures to trip and false trips. The majority of these errors relate to inadequate documentation. The paper established a "top ten" list of errors which contribute to reliability problems. The paper and others are available on the SEL website. Search for "Lessons Learned" or "Commissioning Protective Relaying Systems."

Discussion followed on what constitutes adequate or complete documentation. Question: what do you document? Drawings and documents need to depict the logic inside the relays. Every setting should have justification. The scheme design philosophy needs to be well documented so the commissioning personnel and operating personnel know how the scheme is supposed to operate. The protection engineer must be aware of the level of expertise of the field personnel. The question we need to address with the report is how do various engineering organizations depict scheme logic on drawings to convey the required information? What information can be given on single-line, ac and dc schematic diagrams?

Writing assignments submitted since the previous meetings have been included in the latest draft of the report, which was handed out. Missing assignments were noted and a request was made to submit them by August 15 to Kevin and Rich.

Writing assignments, new and still to be provided:

1. Section II.B – Drawing Types and Hierarchy (Jim Niemira)
2. Section II.D – Uses of Drawings by Different Parties (Roger Whittaker)
3. Section VII. – Single Line Diagrams (Dean Miller)
4. Section VIII. – AC Schematics – are they impacted by microprocessor relays? (John Appleyard)
5. Section VIII.A. – Describe AC Schematics/DC Schematics/3 Lines (Dolly Villasmil)
6. Section V.I. Integration of Digital I/O with Relay to Relay Protocol (e.g. IEC 61850) (Jeff Long – can we still do this?)
7. Section VI. Logic Diagrams (Adi Mulawarman – need to provide more examples like pictures/diagrams for each)
8. Section VII.A. Communications (Craig Preuss)
9. Section VII.B – SCADA (Craig Preuss)
10. Section VII.C. – Tabular Database/Spreadsheet (Tony Seegers)
11. New Section VII.D – Design Philosophy (Lizette Marie Castro)
12. New Section VII.E – Documentation to aid testing (Karl Zimmerman)

For reference by members and guests, the draft document, minutes, and presentations will be posted on the WG I5 web page.

Members are asked to review the draft and propose any modifications. Anyone who has some examples of documentation that might be appropriate to present at the next meeting are asked to notify Kevin and Rich.

I6: Practical Aspects of Rogowski Coil Applications to Relaying

Chair: Ljubomir Kojovic

Vice Chair: Bob Beresh

Output: Special Report to the PSRC

Assignment: Produce a special report describing applications of Rogowski Coils used for protective relaying in electric power systems

I6 met to discuss the latest draft of the document. Lubo was not able to attend but Bob Beresh chaired the meeting in his stead. The latest draft of the document was reviewed and several suggestions were made and sent to Lubo for consideration. It is felt that we should be able to finalize the document by or at the September meeting. Arnold Offner agreed to review the document and add some information on connectors.

I8: Revision of C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

Chair: Brian Mugalian

Vice-Chair: Bruce Magruder

Output: Revision of IEEE/ANSI C57.13.3-2005

Assignment: Revision of C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

Working Group I8, Revision of C57.13.3 - Guide for Grounding of Instrument Transformer Secondary Circuits and Cases, was held in Conference Room II, Madison Concourse Hotel and Governor's Club, Madison WI on May 12, 2010. Nine members and six guests were present.

The seven attendees who volunteered at the January 2010 meeting to review pertinent IEC standards completed their reviews and submitted their reports. The Chair asked the attendees at the May 12 meeting to perform a second search on the IEC web site for any remaining standards using other keywords such as "earthing" and "shielding" to develop a new list of IEC documents. These new documents will be placed on the password protected I8 web page for review. The completed list is due by June 15. Gary Kobet discussed two field situations to see whether they would be good examples of what may happen if improper grounding occurs. Gary will write up a section on these situations for inclusion in the Guide. At the September 2010 meeting in Berkeley CA, the working group will have a spreadsheet for input of all IEC and other document reviews. This will be then lined up with the appropriate section(s) of the Guide to prepare a first draft.

I9: Revision of C37.105 Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations

Chair: Sahib Usman

Vice Chair: Roy Ball

Output: Revision of Standard C37.105

Assignment: Review the applicability of the standard for all relays used in nuclear power plants, specifically digital relays and seismic qualification of the relays. Update the standard in conformance with the latest IEEE Style Manual, and incorporate field experience and state of the art developments.

The WG met with two members to respond to two remaining negative comments that were somehow missing in the package that Roy submitted to Matt Ceglia for the RevCom review meeting. Worked with Matt to prepare the information for the two comments so we could continue on with the submittal of the package for what hope is RevCom's final approval.

Matt stated the need for Roy and Sahib switch places so that Roy would now be Chairman, and as Chairman, he will receive all of the correspondence.

The working may not need to meet in September. However, plan on a single session for 10 people.

I10: Revision of C37.98 Standard for Seismic Testing of Relays

Chair: Marie Nemier

Vice Chair: Munnu Bajpai

Suresh Channarasappa – Co –Chair SC-2

Output: Revision of Standard C37.98

Assignment: Revise and update C37.98

The WG did not meet.

I11: Guide for Application of Optical Current Transformers for Protective Relaying

Chair: Harland Gilleland

Vice Chair: Bruce Pickett

Output: Guide PAR PC37.241 March 25, 2010

Assignment: Develop Guide for “Application of Optical Instrument Transformers for Protective Relaying”

The meeting was called to order with 10 members & 8 guests. We opened with introduction of attendees, a discussion of the agenda, and then focused on WG topics of interest. It was pointed out that we had made a great deal of progress since the Orlando meeting.

One of the key events was the WG PAR which was completed, submitted to the IEEE-SA, and approved on March 25, 2010. The output of the Project will be a Guide, PC37.241, with a title of “Application of Optical Instrument Transformers for Protective Relaying”. We discussed the important sections in the PAR.

The balance of the meeting included constructive discussion on the eleven Sections planned for the Guide. Team Leaders gave updates, from notes or with slides, and discussed the material for their Section – identifying specific areas where they needed help from other WG members – and their plans for updating their material on the Web site. We discussed other PSRC WGs with whom we needed to interface.

Other activities included:

- Discussion of the need for support in reviewing the material being posted – and we got enough volunteers to cover all of the eleven Sections
- Bruce Pickett agreed to serve as Editor-in-Chief for the project – he will follow the IEEE standards template – and he will need help in this activity.
- WG objectives identified included:
 - Provide the WG detailed minutes from the meeting and identify action items that were identified – including objectives for the group.
 - Target for Team Leaders to post all available material by June 15th
 - Start process of combining the various sections into a single document
 - Target to have the first draft of the single document before the end of the year.

I16: Harmonizing of CT Standards within the PSRC

Chair: George Moskos (designate)

Vice Chair: Brian Mugalian

Output: Report

Assignment: Write a PSRC Report which serves as a summary paper for the three previously active CT Standards C57-13.1, C57-13.3 and C37.110.

The working group met with 5 members and 10 guests. The working group assignment is to write a PSRC Report which serves as a summary paper for the three previously active CT Standards C57-13.1, C57-13.3 and C37.110. The draft #1 template for the report has been prepared. By next meeting, the work from all three CT Standards will be outlined in the report.

I17: Trends in Protective Relaying Performance

Chair: Rafael Garcia

Vice Chair: Gregory Sessler

Output: Periodic Reports to Subcommittee

Assignment: Apply criteria in working group report “Transmission Protective relay System Performance Measuring Methodology” to develop a report on performance of in-service relay systems.

The working group met on Tuesday May 11, 2010 with two members and four guests. The chair presented the results of the 2009 performance data report and discussed and group discussed the need for reports in light of the group soon reaching a ten year anniversary and only two companies currently providing data consistently. The plan is to send out the original survey to the original contributors to see how their systems have changed over the years and to see if the original members are willing to submit data one last time to get a better feel as to how system changes have impacted relay performance over the years.

I18 Anomaly Checks for Relay Settings

Chair: Peter McLaren

Vice Chair: Mukesh Nagpal

Output: Report to main committee

Assignment - "The WG will produce a report on relay software features and setting practices which minimize the possibility of wrong settings being downloaded to a relay. The WG will commence its task by conducting a survey of relay manufacturers and utilities to get information on present practice."

The WG met for a single session with 5 members and 10 guests.

The Chair indicated that not all of the assignments for the "Best Practices" document had been received. The meeting briefly reviewed the assignments which had been received including the summary of the features in the CIGRE B5.31 report relevant to this WG. The WG's attention was drawn to the report of WG C3, "Processes, Issues, Trends and Quality Control of Relay Settings." The Chair undertook to review this report and incorporate any new material from this report along with the CIGRE B5.31 material. The Chair would encourage the authors of the missing assignments to get their material to him as soon as possible so that he could get out a draft report in time for consideration at the September meeting. The meeting agreed a short outline document.

I19: Protective Relaying and Redundancy

Chair: S. Ward

Vice Chair: B. Gwyn

Output: Report to Main Committee

Assignment : Produce a special report addressing redundancy considerations for relaying.

Working group report is completed and recommendation made to disband the working group was made by Solveig Ward.

Motion to disband working group made by Rich Young, and second made by Peter McLaren.

Motion to disband approved by I Subcommittee.

I20: Revision of C37.90.1 - IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus

Chair: Tom Beckwith

Vice Chair: Jeff Burnworth

Output: Revision of C37.90.1 SWC Tests Standard

Assignment: To revise IEEE Std C37.90.1TM-2002

The ninth meeting of the Working Group (WG) I20 met on May 11, 2010, in a single session with 7 members and 4 guests. The meeting was chaired by Jeff Burnworth.

The chair showed the slides of the Highlights of the IEEE-SA Standards Board Bylaws on Patents in Standards.

The minutes of meeting #8 in Lake Buena Vista, FL, in January 2010 were approved as submitted.

With regard to harmonization with IEC standards, the Working Group briefly reviewed Draft 4.2, Clauses 4. Test wave shapes, 7. Application of test wave, and 8. Test procedures to confirm that the identified revisions necessary to achieve IEC harmonization are correctly implemented.

However, the IEC target has again moved in the form of a new amendment for IEC 61000-4-4. The Working Group reviewed and considered for possible inclusion the new IEC 61000-4-4, AMENDMENT 1, clause 6.2.2 Verification of the characteristics of the coupling/decoupling network. The working group discussed the item and decided to leave this item for future revision after the change is incorporated in to IEC 60255-22-1 and IEC 60255-22-4.

John Tengdin observed in a February 2010 e-mail that, "all the historic measurements that led to the oscillatory SWC test in C37.90.1 were made in control houses (and none in substation high voltage yards)." John has since reported he has now determined that the tests that led to the development of the SWC Test did indeed include measurements of transients experienced in the substation yard. John documented this in modifications to his earlier draft ANNEX G History of IEEE C37.90.1. The Working Group discussed the modifications and determined to include them.

Annex E Comparison with IEC 60255-22-1 (1988-05) and IEC 60255-22-4 (1992-03) is obsolete and must be replaced. Mario Ranieri suggested that the comparison table that he and Jeff Burnworth prepared be used. The Working Group agreed on the replacement of the previous content of Annex E with this table.

These last changes will be incorporated and be distributed as Draft 5 to the working group by June 15 requesting consensus to go for balloting. After receiving consensus from the WG the draft will be sent to the Subcommittee chair for approval to go for balloting.

ITF1 Manufacturer's Service Letter Database

Chair: Jerry Jodice

Vice Chair:

Output: Service Letter Database

ITF1 met with two people only. It is clear that there is little interest in continuing this TF and it was decided that the September meeting would be the last meeting unless interest was shown by the various manufacturers in supporting this, as discussed at the January meeting. This TF and its future was discussed at the ADCOM meeting as well and there is consensus on this plan.

ITF2: Promotion of Dual Logo of C37.2

Chair: John Tengdin

Vice Chair: TBD

Output: TBD

Meeting: January, 2010

The TF did not meet.

ITF7: Reaffirmation of C37.90.2 Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers

Chair: Jeff Burnworth

Vice Chair: n/a

Output: Determination of Reaffirmation or Revision of IEEE C37.90.2™-2004

Disbanded

ITF9: Reaffirmation of C37.103, Guide for Differential and Polarizing Relay Circuit Testing

Chair: Mohindar Sachdev

Vice Chair:

Output: Recommendation to the PSRC

The Task Force met in Conference Room III, Concourse Hotel and Governor's Club, Madison, WI at 04:30 PM on Tuesday, May 11, 2010. Seven members were present. The chair reported that the following progress was made since the January meeting of the Task Force.

1. The two negative balloters were contacted. One of the balloters confirmed that he would change his ballot from Disapprove to Approve with Comments. A confirmation from the other negative balloter is awaited.

The Chair reported that a total of 21 comments were received with the re-affirmation ballot. The following three key issues are identified in those comments.

- a. The testing procedures are based on using voltmeters, ammeters and energy sources. The modern relay testing sets can be used to perform some of the tests. The testing procedures using the relay test sets need to be incorporated in the guide.
- b. The figures need to be re-drawn because the quality of the figures is not good.
- c. The topic of testing circuits of transformer differential relays is not adequately covered and the information presently provided needs to be augmented.

The Task Force decided that a recommendation for forming a Working Group for revising the guide be submitted to the Subcommittee.

ITF10: Reaffirmation of C37.90 Standard for Relays and Relay Systems Associated with Electrical Power Apparatus.

Chair: Mario Ranieri

Vice Chair:

Output: Recommendation to the PSRC

Date: 12 January, 2010

No Report

Liaison Reports

Instrument Transformer Sub Committee, Liaison

The Instrument Transformer Sub Committee met in Houston in April. I was there. They are reviewing a number of changes proposed for C57.13. The integration of C57.13.5 into C57.13 has run into major resistance. It appears a number of requirements in these two standards are in conflict.

Coordination Reports

None

Old Business

None

New Business

1. Reaffirmation of C37.92 – Analog inputs to Protective Relays from Electronic Voltage and Current Transducers.
- John Tengdin volunteered to set up a reaffirmation ballot. Eric Udren and Jeff Pond volunteered to assist John with the reaffirmation ballot.
2. Reaffirmation of C37.90.2 – Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers.

- Jeff Burnworth reported that negative comments were received for the reaffirmation ballot.

3. New Members: Rafael Garcia, Kevin Donahoe were welcomed into membership of the I SC

J: ROTATING MACHINERY PROTECTION SUBCOMMITTEE

Chair: K. Stephan

Vice Chair: M. Yalla

Scope: Evaluate and report on protective relaying concepts and practices applicable to generators, motors, synchronous condensers, associated auxiliary systems, and performance of plant protective systems. Develop and maintain related relaying standards.

The Subcommittee met on Thursday May 13, 2010 with 18 members (achieving quorum) and 18 guests. There was a call for the approval of the minutes of the January 2010 meeting in Lake Buena Vista (Orlando), FL The minutes were approved by the subcommittee members with minor corrections, J9 at draft 2.0 and J10 at draft 2.0.

Reports from the WG Chairs

J1: Adjustable Speed Drive Motor Protection Application and Issues.

Chair: J. Gardell

Vice Chair: P. Kumar

Established: 2003

Output: Report to the Subcommittee

Expected Completion: Dec 2008

Status: Draft 8 (Final)

Assignment: Investigate and report to the Subcommittee motor protection issues related to motors utilizing variable speed (frequency) drives.

The Working group did not meet at this meeting.

The report is published on the PSRC website. The WG will be writing an IEEE Transactions paper based on the report. Tom Farr will be the editor of the Transactions paper.

J2: Protection Considerations for Combustion Gas Turbine Static Starting

Chair: Mike Reichard

Vice Chair: Zeeky Bukhala

Established: 2005

Output: Report to the Subcommittee

Expected Completion: 2009

Status: Draft 2b (Final)

Assignment: Deliver a paper or report on special protection requirements on generators employing load commutating inverter (LCI) static starting.

The Working group did not meet at this meeting.

The report will soon be published on the PSRC website. At this May subcommittee meeting, Dale Finney volunteered to format the report into an IEEE transactions paper.

J3: Power Plant and Transmission System Protection Coordination

Chair: Jon Gardell

Vice Chair: Phil Waudby

Established: 2010

Output: TBD

Expected Completion: TBD

Status: First Meeting

Assignment: (Proposed, but subject to revision) To support and review drafts of the NERC System Protection and Control Subcommittee's Power Plant and Transmission System Protection Coordination Technical Reference Document as appropriate. Provide some membership participation of the J Subcommittee on the NERC SPCS's Power Plant and Transmission System Protection Sub-team drafting the technical reference drafts.

The initial Working Group (WG) meeting was held on May 11, 2010 with 19 members and 19 guests.

Jon Gardell provided a thumbnail description of the NERC Power Plant and Transmission System Protection Coordination Technical Reference Document. This document had been approved by the NERC Planning Committee in December of 2009. Jon explained that the WG was to create a bridge between that NERC document and the existing IEEE PSRC standards.

Jon described a workshop that was held in Phoenix on the NERC document. NERC has planned a series of webinars on the document that will start the last week of May and continue for five additional weeks. 200 entrants can register for this series, with each meeting lasting approximately 1.5 hours.

As a start to the bridge between the IEEE standards and the NERC document, four assignments were made to review the NERC document and compare it to the appropriate standards. These assignments are for the 40, 24, 27 and 78 functions. The WG will discuss each assignment at the September meeting. In addition, the scope statement will be reviewed prior to the next WG meeting.

Phil Tatro presented a discussion on generator transient simulations. Phil and Jon simulated generator transients by modeling a step change caused when inserting a fictitious reactor on the high voltage side of the step-up transformer. An initial system voltage of 85% was used and the generator watts, vars, voltage, current, and excitation voltage were plotted. Impedance circles at 75 degrees were plotted, using settings from C37.102. Generator power factors of 0.85, 0.90 and 0.95 were modeled, as was additional relay angles. They proposed the use of blinders to decrease the possibility of relay misoperations, while maintaining adequate relay loadability.

Assignments:

40 – Gary Kobet / John Wang
24 – Russ Patterson / Rich Young
27 – Mike Thomson / Mohamed Abdel Khalek
78 – Prem Kumar / Mike Reichard / John Wang

The assignments are due August 15, 2010.

J6: Protection issues Related to Pumped Storage Hydro Units

Chair: Joe Uchiyama

Vice Chair: Robert Frye

Established: 2009

Output: Transactions Paper

Expected Completion: TBD

Status: Third Meeting

Assignment: (Developing at this meeting) To review and summarize the trends of the last thirty-five (35) years of Pump Storage unit protection since PSRC presented the summary report in May/June 1975. The WG review is focused on: (1) Old protection/control, (2) New protection/control, (3) New experiences during protection rehabilitation and (3) any significant issues/concerns. Evaluate and report on protective relaying concepts and practices applicable to a combination of generator and motor, associated auxiliary systems, and performance of plant protective systems. Summarize the trend of Pump-Storage motor and generator protection for last thirty-five (35) years of industrial practices.

WG meeting was held in afternoon of May 12, 2010 with 22 attendees, 9 members and 13 guests.

Chairman opened the meeting with the "Introductions" and explained the 1975 Transaction Paper "PROTECTIVE RELAYING FOR PUMPED STORAGE HYDRO UNITS." This paper was based on E/M discrete relays for the protection on pumped storage units. Chairman pointed out that this transaction paper was published in 1975 (35 years ago). The schemes required phase swapping between generation and motor modes. Modern microprocessor relays, which are capable of swapping phases internally, have been applied to pumped storage units in recent years. The working group will report on the changes in philosophy in the protection schemes of the pumped storage units over the past 35 years. The chairman encouraged the meeting attendees to become members of this WG, and contribute to this report. Nine of the attendees became WG members. Also, attendees brought up their experiences during upgrading protections in the meeting.

One of the significant examples is that for the discrete E-M relay system, auxiliary bus has motor/generator differential relay circuits that have need to swap the phases often and sometimes these relays are left with differential operating current for extended periods such that the relay contacts wear-out.

WG also discusses the assignment statement & Output of this report as the following:
Output – IEEE Transaction Paper

The chairman had brought out TVA's recent experiences of the protection for pump storage units as an example.

WG had also raised the following issues:

- Report should include the issues/measures on old protective schemes & relay applications,
- Report should include lessons Learned during recent relay rehabilitation projects,
- Chairman will make a draft of survey form.
- WG members will review the survey form.
- Chairman will make a contact list for the original 1975 participated utilities.
- Perform brief survey for status of the original 1975 participated utilities and any other utilities which have pumped storage units.
- If possible, the survey results will be brought to September 2010 meeting.

Robert Frye from TVA volunteered to be vice-chair of the working group.

J7: Revision of C37.101, Generator Ground Protection Guide

Chair: J.T. Uchiyama

Vice Chair: R. Das

Co-Vice Chair: Mike Reichard

Established: 2000

Output: Revised Guide

Status: Completed

Assignment: Review and revise as needed C37.101.

The Working Group did not meet this session. Since the work of the working group is completed the WG was disbanded.

J8: Generator Tutorial Revision

Chair: Michael Thompson

Vice Chair: Chris Ruckman

Established: 2007

Output: Tutorial (published by PSRC)

Expected Completion: 2010

Status: near final Phase I (document)

Assignment: Review and Revise 95-TP-102, "IEEE Tutorial on the Protection of Synchronous Generators."

The Working Group met for a single session with 21 members and 6 guests.

Output will be a special publication of the PSRC and published on the PSRC website. Phase two output will be an eight-hour tutorial presentation. An expected date of completion for phase 1 is May 2010. The expected date of completion for the draft tutorial slides is August 2010. We are presently on draft 1.

The minutes of the January 2010 meeting were approved as written.

The Working Group discussed whether the IEEE PES general meeting should be considered as a possible venue for the tutorial. M. Sanders indicated that there is a committee within PES that focuses on education and develops venues for tutorials. Recent tutorials at the T&D convention were well attended. PES is charging approximately \$100 per person and there is some profit sharing to help offset travel expenses incurred by the presenters. R. Patterson presented at the T&D convention with approximately 40 attendants. It was generally expressed that this tutorial would have wide interest at this venue. M. Yalla indicated that there were 30+ attendees at the PES general meeting in Portland in 1995. The general consensus of the Working Group was to present the tutorial at a future PES meeting. The Chair will pursue scheduling a tutorial session at a future PES general meeting.

The tutorial will be presented at the PSRC Asheville meeting on the Monday preceding the conference. There will be a nominal charge for the expenses associated with the training.

K. Stephan indicated that a commercial firm has expressed interest in having the tutorial presented in conjunction with one of their training programs. M. Sanders cautioned about potential issues with this approach.

H. Monterrubio gave a presentation on using webinar technology to deliver training. The presentation indicated that the two biggest factors affecting quality webinars are 1) having a good moderator and 2) having slides designed specifically for a webinar. It was general consensus that webinars are the best tools for reaching the biggest audience.

The Chair reviewed the combined tutorial document seeking feedback on its layout and packaging. The general consensus of the Working Group was that the format works well. It was suggested that the Working Group's membership be added to the second page of the coversheet. Multiple members of the Working Group expressed their gratitude to Kim Sarff for the outstanding job done with the document. The Chair will inquire about adding navigation buttons at the end of each section to allow the reader to easily go to the next section. Potential compatibility issues with older versions of Adobe were raised and it was suggested that a note be added at the front of the document indicating which version(s) of Adobe provided for optimal viewing. Security should be considered for the final document.

The Chair noted that the bibliography and references in the document required updating. The authors of the individual sections need to review and update references as necessary. Z. Bukhala will work on updating the bibliography using the latest version of C37.102 as a starting point.

The Chair iterated that the Working Group's document needed to be finalized and balloted by the J Subcommittee prior to C. Mozina's presentation at the PCIC during the third week in September. It was noted that sufficient time to resolve any comments from Subcommittee needed to be factored into the overall schedule. It was agreed that the document should be sent out for J Subcommittee balloting at the end of May. If necessary, it can be sent out without the bibliography. It was agreed that the Working Group review would run in parallel with the Subcommittee review.

Slides for the September presentation were discussed. It was agreed that each of the section authors would prepare the approximate number of slides noted in the handout. The Chair will forward a PowerPoint template for the slides. Slides should be complete by August 1 and should include presenter notes.

J9: Motor Bus Transfer
Chair: Jon Gardell
Vice Chair: Dale Fredrickson
Established: 2006
Output: Working group report
Expected Completion: 2011

Status: Draft 3.0

Assignment: Investigate protection and control issues and phenomena impacting the effectiveness of safely transferring buses primarily consisting of motors from one power source to another source.

The Working Group (WG) met in a double session with 14 Members and 8 Guests on Wednesday, May 12, 2010. This was the thirteenth meeting.

1. Jon Gardell started the meeting off with a status report on both Draft III of Volume 1 and the field measurement plans at the TECO plants. Dale Fredrickson's – the Working Group's Vice Chairman was unable to attend and Hugo Monterrubio helped out by sitting in for him. Thanks to Hugo.
2. Dr. Murty Yalla gave a presentation on the results of the data acquired during the TECO Bayside Plant staged test. One single 1750 HP motor was transferred with a number of smaller 480 Volt motors. The waveforms that were captured are quite interesting and a sub-team will investigate additional analysis with results such as calculation of motor and shaft torques.
3. Hugo Monterrubio provided a summary status report on the TECO Big Bend Unit 4 tests, installation of the recorders, and monitoring points. He showed a one line identifying the measurement points of voltages and currents. The unit is presently in outage and during this outage the plan is to install the recorders and associated equipment.
4. The second session was spent reviewing the Draft III of the Volume 1 report that had been extensively edited and revised by Tom Beckwith. A few additional writing and editing assignments were given to Working Group members to complete this document.
5. The plan is to complete the draft and send it out for comment and approval before the September meeting. These comments will be discussed in that meeting.
6. Dale Finney will complete a short summary of this document for use in the Revision of the Motor Protection Guide, C37.96. He will provide a report during the September meeting to this Working Group.
7. All assignments are due on or before August 15.

J10: PC 37.96 Guide for AC Motor Protection

Chair: Prem Kumar

Vice Chair: Dale Finney

Established: 2007

Output: Guide Revision C37.96

Expected Completion:

Status: Draft 3.0

Assignment: Review and revise C37.96-2000 as needed.

The meeting was attended with 12 members and 7 guests. After the introductions, the Patent Slides were shown.

The Orlando meeting minutes which was circulated was approved with quorum.

Following are the follow up action items/assignments based on meeting. All remaining assignments/peer review are due by August 15th. WG members would copy relevant section from D3 draft and make modifications as required and send to Prem for incorporation into next draft of document. The various item number topics are shown in the last two sheets of this report.

- 1) Suhag Patel would add a section on the pros and cons of Motors RTD when available in relay.
- 2) Pat Kerrigan and Subash Patel would add some text to discuss protection of high inertia motors

- 3) Prem would recirculate the example with the comments discussed at the WG meeting 1) Symbols would be based on ANSI b) The PT connection in the single line will show the type of PT connection c) Overvoltage protection write-up would be modified as marked up d) Retain jogging as backup to thermal protection e) Make some statement that when all motor data is not available, a basic protection scheme to be used which would be overcurrent and locked rotor protection f) editorial comments pointed out by Subash and Chris Ruckman will be incorporated..This will then be added to the draft.
- 4) Dale Finney would summarize the Motor Bus transfer Volume 1 draft and present the summary to the Motor Bus transfer group in the September Meeting.

Prem would send an electronic copy of D3 version.

JTF4: Gen. Protection Issues-stability and dynamic control of Power Systems

Chair: Kevin Stephan

Established: 2010

Output: Presentations to PSDP Committee

Expected Completion: 2011

Status: First Meeting

Assignment: To develop an agenda for J subcommittee presentations at a joint meeting with PSDP in January 2011.

The task force met it 12 people signing up as members and 15 guests.

Charlie Henville, the PSRC liaison with the Power System Stability Controls (PSSC) subcommittee of the PSDP was in attendance and went over some of the points brought up within the PSSC as a result of a panel session held at the 2009 PED General meeting, specifically the considerations for setting the 40 function (loss of field) on generator protection.

The task force discussed the 40 function as well as 78 (out-of-step), and AVR interaction. J Subcommittee publications J6 (Performance of Generator Protection During Major System Disturbances), J5 (Coordination of Generator Protection with Generator Excitation Control and Generator Capability), J4 (C37.102 IEEE Guide for AC Generator Protection), all have slide presentations made that can be modified for this joint meeting. In addition, the information and future slides of J8 (Generator Protection Tutorial, 2nd Ed.) will also be applicable.

Suhash Patel will look at J6

Murty Yalla will look at J4

Mike Reichard will look at J5 and

Juan Gers will look at the 78 function and the presentation he made to J8.

Ilia Voloh also volunteered to assist and it was suggested to get the Excitation committees involved perhaps via Mike Basler.

It was also suggested to look at Gary Kobet's paper on PLU (Power-Load Unbalance)

Draft Presentations are to be ready for quick review by the September PSRC JTF4 meeting.

Other Reports:

C17: Fault current contribution from wind farm plants

Charlie Henville gave a verbal report and the minutes can be found in C subcommittee report.

Liaison Reports

Electric Machinery Committee (EMC)

C.J. Mozina

The Committee met at PES General Meeting in Calgary, Canada --- July 26-30, 2009. The minutes of the Calgary meeting have not been posted on their website. The minutes of the 2008 EMC are the latest minutes on their web site. At this meeting of the EMC a newly formed WG on Generator-Grid Interaction chaired by Thomas Wait met. This is an area of interest to the PSRC. It is assumed that a WG meeting was held in Calgary but no WG minutes are posted as yet on the EMC website.

IAS I&CPS Committee

C.J. Mozina

This report will be given at the main PSRC committee meeting. The written report is published under main committee liaison reports.

Nuclear 1E WG

P. Kumar

IEEE 741 group (protection of Nuclear 1E systems and equipment) is developing a paper "Rethinking degraded grid protection" in response to NRC pushing plants to raise degraded voltage settings during the CDBI (component design basis Inspections). This "increased voltage setpoint" raises the concern of IE systems spuriously going on the Emergency Diesel Generator. The plan is to draft a paper by end of 2010 and present in 2011. IEEE 741 will be reviewed for possible impact and may be revised.

NERC

J. Uchiyama

The NERC Technical Reference document was published in Dec 2009. NERC SPCS also held a workshop on power plant and transmission system protection coordination in Phoenix, AZ. The SPCS will be meeting in San Francisco, CA during May 18 and 19th 2010.

Coordination Reports

None

Old Business

None

New Business

AURORA. After a short presentation based on the November 2009 U.S. Department of Defense AURORA overview, a J task force (JTF7) was created to consider PSRC involvement. This consideration was instigated by the request of several PSRC members as well as the scope statement of the PSRC seems to apply. Mike Reichard volunteered to chair the first meeting at the September 2010 meeting of the PSRC.

K: SUBSTATION PROTECTION SUBCOMMITTEE

Chair: P.G. Mysore

Vice Chair: M. J. Thompson

Reports from the WG Chairs

K4: (PC 37.95.2002): GUIDE FOR PROTECTION CONSUMER UTILITY INTERFACE

Chairman: Mukesh Nagpal

Vice Chair: Chuck Mozina

Established: 2008

Output: Guide Revision

Expected Completion Date: 2012

Assignment: To revise C37.95-2002 (R2007) – Guide for Protective relaying of Utility-Consumer Interconnections

The working group met on Tuesday, May 11th, with 7 members and 12 guests present. A quorum was not present. The meeting was conducted by Jeff Barsch and Ken Behrendt in the absence of the chair and vice chair.

The acting chairman reviewed the minutes from the January 2010 meeting. The IEEE Patent slides were shown and reviewed.

WG writing assignments and the progress to date were reviewed, starting with suggested changes to Clause 4, "Typical utility-consumer interconnection configurations". Suggested alternatives to bypass switches on the consumer high-side protection were discussed. General consensus was that bypass switches are undesirable and should be eliminated from the document because it implies that the utility is responsible for consumer equipment protection when the consumer protection equipment is bypassed. At least two attendees indicated that their utilities are inclined not to provide any protection for customer's equipment.

There was general agreement that some indication showing utility/consumer ownership demarcation should be included on the drawings. Related clause 3.1, "interconnection" also needs to be clarified to identify the point of ownership demarcation. Steve Conrad volunteered to revise clause 3.1 to provide this clarification.

Figures 4, 5, and 6 need to show the consumer-owned transformer on the tap to the consumer load. After considerable discussion, the group agreed that the line switches, and line breakers shown in these figures are owned by the utility.

A new clause 3 should be added for definitions to provide consistency with IEEE guide format. Adi Mulawrman volunteered to review the guide for terms that need to be defined in the new clause 3.

Ken Behrendt volunteered to expand on the required quality of CTs in the section on sensing devices.

Writing assignments are due to the chairman by August 6th.

K5: APPLICATION OF COMMON PROTECTIVE FUNCTIONS IN MULTI-FUNCTION RELAYS

Chair: Simon Chano

Vice Chair: Dean Miller

Established, 2005

Output: Report to the PSRC

Expected completion date: 2010

Draft 5 of Summary Paper

Assignment: Develop a document that addresses the considerations in applying the ancillary protection and control functions that are common in multiple relays and the integration of these functions into the overall protection system. This document addresses subjects related to specific topics such as: breaker failure, automatic reclosing, synchronism check, voltage status monitoring, breaker controls, and event and fault recording. The applications of duplicate protective schemes are discussed with consideration for security, dependability, testing, and maintenance.

Working Group K5 met in a single session on Tuesday, May 11, 2010 in Madison with 7 members and 11 guests.

In Simon Chano's absence Dean led the meeting and Randy Crellin took meeting notes. The minutes from the January meeting were approved.

Draft 4 of the summary paper had sent out for Substation Subcommittee members for review. As of now responses from 19 members have been received. All of the responses so far have been affirmative.

Several good comments for improvements to the paper have been received. These comments have been incorporated into draft 5 of the paper.

Copies of draft 5 were distributed at the meeting and a redline version of the draft was displayed. Several additional editorial corrections were resolved. Mike Thompson and Roger Whittaker will be writing a brief addition to the breaker failure section. This addition will be inserted before figure 1 to clarify the fault detector function and the initiation of breaker failure function contained in fault detecting relays by fault detecting relays that do not have internal breaker failure functions.

The summary paper will be submitted to the following conferences by the listed working group members:

Roger Whittaker	Western Protective Relay Conference
Bruce Mackie	Georgia Tech Relay Conference
Mike Thompson	Texas A&M Relay Conference
Roger Hedding	MIPSYCON

The summary paper will also be presented at the January main committee meeting.

Dean will continue to work at getting the needed 27 responses from the subcommittee members. The Working Group will not be meeting in September.

K6: SUDDEN PRESSURE PROTECTION FOR TRANSFORMERS

Chair: Randy Crellin

Vice Chair: Don Lukach

Established: May 2005

Output: Report

Expected Completion Date: January 2011

Draft 2.0

Assignment: To complete a technical report to the Substation Protection subcommittee on the application of sudden pressure relaying in power transformers.

The working group met on Wednesday morning, May 12th, in a single session with 10 members and 13 guests. Two of the guests indicated that they would like to become members of the working group. The working group currently has 18 members.

After introductions and a brief review of the working group progress to date, we presented and discussed the results of the sudden pressure relaying survey that had been re-filtered for only valid "North American Utility" responses. After viewing only the second slide, we quickly realized that we would need to interpret the data and provide additional information for each slide to help the reader better understand the responses. After going through the complete survey, we decided the next step was to form a group of volunteers to work via conference calls to rework the format of the survey summary report.

The working group was again encouraged to review the latest draft of the document and to provide comments and/or suggestions for additional writing assignments. These comments are due by the first of August and will be discussed along with the final survey report during our September meeting in Berkeley.

For the next meeting, we would like to request a single session, room for 20 people, and a computer projector.

K8: GUIDE FOR THE PROTECTION OF SHUNT CAPACITORS

Chair: Pratap Mysore

Vice Chair: Iliia Voloh

1. Established, 2006

Output: Revision of IEEE C37.99-2000

Expected Completion date: 2011

Status: Draft 4.0

Assignment: Revise and update C37.99-2000 "Guide for the Protection of Shunt Capacitor Banks."

The Working group, K8, met on May 11, 2010 in one session with eleven members and six guests in attendance. After the introductions, IEEE Patent slides regarding the patent policy was shown. January meeting minutes was approved via e-mail in February 2010

Bogdan briefly explained his submittal on impedance measurement technique and integration method for overvoltage detection that would be included in the guide. Further discussions on where to include this write up and what else would make the guide more presentable led to the proposal to add a section on "introduction to unbalance protection" before the existing unbalance clause. Bogdan agreed to submit a write up on this topic.

Greg Sessler submitted his review of clauses 8.4 and 8.5. Ilia will review and incorporate the required changes in the draft.

Bogdan reviewed the draft 4 and submitted his comments. Ilia and Pratap will work with Bogdan and include appropriate changes in the next draft. Comments on definitions will be discussed with capacitor subcommittee to ensure consistency in all IEEE documents related to shunt capacitor.

There were discussions on adding a section on selection of instrument transformers and on Ferro-resonance issues. The suggestion from the group was to find an expert who would provide an input to the working group. Pratap will follow up

Bob Wilson pointed out a correction in the unbalance calculation. Pratap and Ilia will review the tables for accuracy.

Pratap pointed out that the PAR will end in December of 2011. In order to complete the work, the proposed course of action would be to have a ballot ready draft by the end of 2010. This needs a more coordinated effort including an effort to make drawings consistent. Al Darlington could not be contacted in last three months. Pratap will follow up to see if any other member could assist in reviewing figures.

Clauses 8.2 and 8.3 were to be reviewed by other members but, no responses were received.

Action item from previous meeting - The referenced paper by John Harder included in the guide points out to an abstract of the paper instead of the paper. This paper was presented at a PES summer meeting. IEEE is figuring out a way to make this paper available. Pratap will send a PDF copy of the paper to Matt Ceglia of IEEE for further action.

The next draft will be sent out for review by August 15, 2010. The chair requests all members to review draft 4 and send in their comments/ corrections before July 15, 2010

K10: SCC21 DISTRIBUTED RESOURCES STANDARD COORDINATION

Chair: Gerald Johnson

Vice Chair: TBA

Established, 1999

Output: Standard through the SCC 21

Expected Completion Date: 200x

Assignment: To interface with SCC21/P1547 in order to reduce unnecessary delays by getting PSRC input into the process without having to wait for after-the-fact coordination.

K10--SCC21 Distributed Resources Standard Coordination working group met May 11, 2010 with 4-members and 5-guests. Status of the active working groups remaining in the 1547 series was reviewed as follows:

P1547.4 "Draft Guide for Design, Operation and Integration of Distributed Resource Island Systems with Electric Power Systems", has been balloted but results have not been released to date.

P1547.5 "Draft Technical Guidelines for Interconnection of Electric Power Sources Greater than 10MVA to the Power Transmission Grid", no activity, no draft.

P1547.6 "Recommended Practice for Interconnecting Distributed Resources With Electric Power Systems Distribution Secondary Networks" is at draft 6 and a ballot pool has been formed.

IEEE P1547.7 "Draft Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection" is at draft 3.0. Bob Saint, chair of P1547.7 also has a working group in the Distribution

Subcommittee entitled "Distributed Resource Integration" which meets several times a year. This working group contributes information to the P1547.7 working group.

All other 1547.x standards and guides are complete and available for purchase.

The next P1547.x working group meetings will probably be in August but has not been scheduled at this point. If you have special interest in the progress of a particular SCC21 working group or would like to provide input, let me know and I will make sure the information gets to the right place.

KTF3: Reducing Outages Through Improved Protection And Auto restoration In Transmission Substations

Chair: Bruce Pickett

Vice Chair: TBD

Established: 2010

Output: Papers – 1. Full Paper, and 2. Summary Transactions Paper

Expected Completion Date: TBD

Draft xxx Transactions Summary paper xxxx

Assignment: To prepare a paper or a report on protection methods that reduces outage durations in substations with auto restoration and communication techniques

Meeting was called to order May 12, 2010 with 2 members and 8 guests.

Introductions were done

Scope was reviewed as the task force was meeting for the first time.

We reviewed the paper outline from the K3 WG that was done on Distribution with the same topic.

We reviewed a hit list of topics for transmission autorestoring topics, and reclosing topics. It was felt that many of the reclosing topics may already be covered in the C37-104 Reclosing Guide WG and that I should see Gary Kobet to discuss this part.

Another topic that was discussed was TPDC- Smart Grid applications / coordination and how the data from the microprocessor relays is taken into the utility sites and automated and used.

We reviewed this new topic of asking for a new WG to do a paper on **Reducing Outages in Transmission Stations, and Detection of Incipient/Impending Transmission Related Faults.**

This will be requested at the Subcommittee meeting or possibly see about having a second Task Force Meeting in Sept after gathering some additional information prior to the next meeting and then presenting this at that meeting.

KTF4: JOINT TASK FORCE T & D CAPACITOR SUB-COMMITTEE, K13 SERIES CAPACITORS

Chair: Simon Chano

Vice Chair: Mark Mcvey

Established: October 2009

Output: jointly prepare a PAR to issue a corrigendum to the guide.

Expected Completion Date: TBA

Assignment: Coordinate PSRC standards activity with Capacitor Subcommittee

KTF4 did not meet at this meeting.

KTF9: LIAISON TO K SUB COMMITTEE TO REPORT ON ARC FLASH ACTIVITIES BY OTHER GROUPS

Chair: Karl Zimmermann

Vice Chair: NA

Established: January, 2009

Output: TBD.

Expected Completion Date: TBA

Assignment: Coordinate PSRC standards activity with Capacitor Subcommittee

KTF9 did not meet at this meeting.

Liaison Reports:

Nothing to report

Old Business:

Nothing to report

New Business:

1. Roger Hedding requested that all working groups consider if they can use a shorter meeting time slot for their meetings. He is proposing that one half day be formatted with four 50 minute meetings instead of three 75 minute meetings.
2. KTF1 was formed to investigate updating the PSRC technical paper, "Protection of Phase Angle Regulating Transformers." This new task force will investigate if the material can be condensed and provide new material for inclusion in C37.91 when it comes open again. Arvind Chaudhary has agreed to chair this task force.
3. KTF2 was formed to investigate whether the K subcommittee should create a paper or guide on application of free standing current transformer column ground protection schemes. TVA and AEP have both experienced misoperations of this protection scheme and TVA is removing them from service. The task force will examine the need for this protection and the consequences of not applying it. They will examine the material in the present version of C37.234 and see if the subject needs further discussion. Finally, the task force will determine possible causes of misoperations and determine if guidelines can be developed for designing the scheme in such a way to improve its security. Dominick Fontana has agreed to chair this task force.

VII PRESENTATIONS:

Our main committee meeting is greatly enhanced by presentation by our members of the outputs of the different working groups. We always appreciate their efforts. This time we had two interesting presentations.

Relaying and Redundancy – I19

Solveig Ward

**Understanding Microprocessor-Based Technology
Applied to Relaying – I1**

Moh Sachdev

VIII. The meeting was adjourned by Chairperson Miriam Sanders